

91-04463/

**A BIOLOGICAL INVENTORY AND
EVALUATION OF THE MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA**

**GARTNER LEE LIMITED
APRIL 1990**

**Ontario Ministry of Natural Resources
Fish and Wildlife
Huron District, Midhurst
Parks and Recreational Areas Section
Central Region, Aurora**



The full citation for this report is:

Gartner Lee Limited. 1990. A Biological Inventory and Evaluation of the Matchedash Bay Provincial Wildlife Area. Fish and Wildlife, Huronia District and Parks and Recreational Areas Section, Central Region. Ontario Ministry of Natural Resources, Aurora, Ontario. Open File Ecological Report 9003, vii + 117 pages + appendices + 5 maps in back pockets.

For convenience, this report may be referred to as OFER 9003. It is one of a number of Open File Ecological Reports comprised of reconnaissance surveys and detailed inventories of ecological resources in Ontario.

Additional copies of this report are obtainable from the Ontario Ministry of Natural Resources from the following source: Public Information Centre, Room 1640, Whitney Block, Queens Park, Toronto, Ontario M7A 1W3.

Reference copies of this report are available in the offices of the Central Region, 820 Yonge Street South, Aurora, Ontario L4G 3G8 Telephone (416) 841-9341 and the Natural Resources Library, 4th Floor, Whitney Block, Room 4540, 99 Wellesley Street West, Toronto, Ontario M7A 1W3. Copies have been sent to university libraries in southern Ontario.

ISBN 0-7729-7529-9

©1990, Queens Printer for Ontario

Printed in Ontario, Canada

TABLE OF CONTENTS

Letter of Transmittal	<u>PAGE</u>
1.0 INTRODUCTION	1
1.1 BACKGROUND	1
1.2 SCOPE AND OBJECTIVES	2
1.2.1 Study Area	2
1.2.2 Study Goal and Objectives	4
2.0 METHODS	5
2.1 BACKGROUND DATA COLLECTION	5
2.2 FIELDWORK	5
3.0 PHYSICAL SETTING	10
3.1 BEDROCK GEOLOGY	10
3.2 PHYSIOGRAPHY AND SURFICIAL GEOLOGY	10
4.0 HERITAGE RESOURCES	12
4.1 INDIAN SETTLEMENTS	12
4.2 EUROPEAN SETTLEMENTS	15
5.0 VEGETATION	16
5.1 INTRODUCTION	16
5.1.1 Regional Context of Vegetation	16
5.1.2 Vegetation Classification	19
5.2 VEGETATION COVER TYPE DESCRIPTIONS	20
5.2.1 Forest Class	22
5.2.2 Parkland Class	27
5.2.3 Shrub Class	27
5.2.4 Dwarf Shrub-Barren Class	28
5.2.5 Open Upland Class	29
5.2.6 Open Wetland Class	30
5.2.7 Aquatic Class	32
5.2.8 Anthropogenic Class	34
6.0 BIRDS	34
6.1 WATERFOWL	35
6.1.1 Breeding	35
6.1.2 Staging	45
6.2 WETLAND BIRDS	52
6.2.1 Breeding Species	52
6.2.2 Migrants	57
6.2.3 Summer Visitors	57
6.2.4 Blackbird Roosts	58
6.3 UPLAND BIRDS	59
6.3.1 Significant Species	59
7.0 OTHER FAUNA	61
7.1 MAMMALS	61

7.2 REPTILES AND AMPHIBIANS	65
7.3 BUTTERFLIES	67
8.0 FISHERIES RESOURCES	68
8.1 FISH COMMUNITY COMPOSITION	68
8.2 AQUATIC HABITATS	70
8.2.1 Riverine	71
8.2.2 Littoral Marsh	72
9.0 SURFACE WATER	75
9.1 INTRODUCTION	75
9.2 WATER QUALITY	75
10.0 SIGNIFICANT FEATURES	78
10.1 AREA OF NATURAL AND SCIENTIFIC INTEREST (ANSI)	78
10.2 PROVINCIALLY SIGNIFICANT (CLASS I) WETLAND	83
10.3 OPEN MARSH	83
10.4 SEDGE FEN	84
10.5 CEDAR-TAMARACK SWAMP	85
10.6 LOWLAND FOREST	85
10.7 ROCK BARRENS	86
10.8 "THE CHIMNEYS"	87
11.0 MANAGEMENT CONSIDERATIONS	87
11.1 HERITAGE RESOURCE MANAGEMENT	88
11.2 ANSI MANAGEMENT	89
11.3 RARE SPECIES MANAGEMENT	91
11.4 FISHERIES MANAGEMENT	92
11.5 FUTURE MONITORING	97
12.0 REFERENCES	99

LIST OF FIGURES

FIGURE 1	STUDY AREA LOCATION	3
FIGURE 2	PHYSIOGRAPHIC REGIONS	11
FIGURE 3	SOILS AND PHYSICAL TERRAIN FEATURES	BACK POCKET
FIGURE 4	SIGNIFICANT ARCHAEOLOGICAL SITES	14
FIGURE 5	VEGETATION COVER TYPES	BACK POCKET
FIGURE 6	SIGNIFICANT SPECIES	BACK POCKET
FIGURE 7	WATERFOWL BROOD COUNT SURVEY, MATCHEDASH BAY, JULY 11, 1989	38
FIGURE 8	WATERFOWL BROOD COUNT SURVEY, MATCHEDASH BAY, AUGUST 4, 1989	39
FIGURE 9	AGE CLASS OF WATERFOWL BROODS, MATCHEDASH BAY, JULY 11, 1989	40
FIGURE 10	AGE CLASS OF WATERFOWL BROODS, MATCHEDASH BAY, AUGUST 4, 1989	41
FIGURE 11	AQUATIC HABITAT TYPES	BACK POCKET
FIGURE 12	HYDROLOGICAL SAMPLING STATIONS	76
FIGURE 13	TOTAL PHOSPHORUS LOAD TO MATCHEDASH FROM COLDWATER AND NORTH RIVERS	77
FIGURE 14	TOTAL PHOSPHORUS CONCENTRATIONS, MATCHEDASH BAY, 1989	79
FIGURE 15	CHLOROPHYLL A CONCENTRATIONS, MATCHEDASH BAY, 1989	80
FIGURE 16	SECCHI DISC READING, MATCHEDASH BAY, 1989	81
FIGURE 17	ANSI BOUNDARIES AND SIGNIFICANT FEATURES	BACK POCKET

LIST OF TABLES

TABLE 1 SIGNIFICANT FLORA OF THE MATCHEDASH BAY PROVINCIAL WILDLIFE AREA	23
TABLE 2 WATERFOWL PRODUCTION IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA, APRIL 24 - MAY 17, 1989	42
TABLE 3 SPRING WATERFOWL STAGING COUNTS, MATCHEDASH BAY PROVINCIAL WILDLIFE AREA, APRIL 24 - MAY 17, 1989	46
TABLE 4 AUTUMN WATERFOWL STAGING COUNTS, MATCHEDASH BAY PROVINCIAL WILDLIFE AREA, AUGUST 28 - NOVEMBER 7, 1989	49
TABLE 5 WETLAND BIRD SPECIES OBSERVED DURING MATCHEDASH BAY WATER FOWL SURVEYS, APRIL 24 - NOVEMBER 7, 1989	53
TABLE 6 SIGNIFICANT FAUNA OF THE MATCHEDASH BAY PROVINCIAL WILDLIFE AREA	55
TABLE 7 MUSKRAT HOUSECOUNTS, MATCHEDASH BAY PROVINCIAL WILDLIFE AREA 1979-1987	63

APPENDICES

- | | |
|------------|--|
| APPENDIX A | DATA SHEETS ON KNOWN ARCHAEOLOGICAL SITES,
MATCHEDASH BAY AREA (OMCC 1989) |
| APPENDIX B | LIST OF PLANT SPECIES RECORDED IN
MATCHEDASH BAY PROVINCIAL WILDLIFE AREA |
| APPENDIX C | LIST OF BIRDS RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA |
| APPENDIX D | LIST OF MAMMALS RECORDED IN MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA |
| APPENDIX E | LIST OF AMPHIBIANS AND REPTILES RECORDED IN
MATCHEDASH BAY PROVINCIAL WILDLIFE AREA,
1982 - 1989 |
| APPENDIX F | LIST OF BUTTERFLIES RECORDED IN MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA, APRIL -
SEPTEMBER 1989 |
| APPENDIX G | LIST OF FISH SPECIES RECORDED IN MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA |
| APPENDIX H | MATCHEDASH BAY WATER QUALITY DATA, MAY -
SSEPT. 1989 |
| APPENDIX I | MOE WATER QUALITY DATA, NORTH RIVER AND
COLDWATER RIVER, JAN. 1986 - JUNE 1989 |
| APPENDIX J | LIFE SCIENCE INVENTORY CHECKSHEET,
MATCHEDASH BAY ANSI |
| APPENDIX K | WETLAND EVALUATION AND DATA RECORDS,
MATCHEDASH BAY WETLAND |

GARTNER LEE LIMITED
STUDY TEAM

Project Manager:

Donald M. Fraser, M.Sc.,
Senior Consultant, Biologist.

Corporate Advisor:

John F. Gartner, P.Eng.
Consulting Engineering Geologist

Principal Investigators:

- | | | |
|------------------------|---|--|
| Soils & Geology | - | John F. Gartner |
| Heritage Resources | - | James Hunter, MMST,
Archaeological Research
Associates Ltd. |
| Vegetation | - | James Kamstra, M.E.S.,
Terrestrial Biologist and
R.S.W. Bobbette, Consulting
Practical Naturalist |
| Birds | - | Donald M. Fraser and
James Kamstra |
| Herptiles
& Mammals | - | James Kamstra |
| Fish | - | Deborah Martin-Downs, M.Sc.,
Fisheries Biologist |
| Surface Water | - | Cynthia Russel, B.Sc.
Aquatic Scientist |

Field Assistants:

Karen Teasdale,
3rd year Fish & Wildlife,
University of Guelph

Mark Manning,
Surface Water Technologist

Peer Review:

A. Joyce Gould, M.Sc., Biologist

ACKNOWLEDGEMENTS

Many individuals contributed to the success of this study. In particular, the guidance and advice provided by W. Dan Mansell, Huronia District Manager (OMNR), Alex Smith, Fish and Wildlife Supervisor, Huronia District (OMNR), Bob Law, Resource Liaison Officer, Huronia District (OMNR), John Winters, Parks Supervisor, Huronia District (OMNR) and John L. Riley, Regional Ecologist, Central Region (OMNR) was extremely helpful. Ron Mills, MillsPlan Consulting Limited, played a major role in integrating the results of the biological inventory with the management plan. The assistance of the following individuals, who provided valuable information and logistical support, is gratefully acknowledged:

- . Bob Alison, Waterfowl Specialist, Orillia
- . Bob Bowles, Orillia Field Naturalists Club, Orillia
- . Dr. Hugh Boyd, Canadian Wildlife Service, Ottawa
- . Ms Marilyn Bidgood, Ontario Ministry of Food and Agriculture, Elmvale
- . Peter Carruthers, Heritage Branch, Ontario
Ministry of Culture and Communications, Toronto
- . Gord Collett, Helicopter Pilot, Air Muskoka, Gravenhurst
- . Darrell Dennis, Ontario Region, Canadian Wildlife Service, London
- . Rick Cronin, Huronia Trappers Council, Waubaushene
- . Ted Gadawski, Waterfowl Biologist, Ducks Unlimited (Canada), Barrie
- . Ms Kathy Gray, Heritage Branch, Ontario
Ministry of Culture and Communications, Toronto
- . Dr. Nancy Ironside, Orillia Field Naturalists Club, Orillia
- . Dan McDonald, Helicopter Pilot, Canadian Helicopters Ltd., Buttonville
- . Dr. A.A. Reznicek, Curator, Herbarium, University of Michigan, Ann Arbor
- . Keith Sherman, Coordinator, Severn Sound Remedial
Action Plan, Ontario Ministry of the Environment
- . Todd Tomacek, Helicopter Pilot, Canadian Helicopters Ltd., Buttonville

This study was funded by the Canadian Wildlife Service as part of the Eastern habitat joint venture of the North American Waterfowl Management Plan.

1.0 INTRODUCTION

1.1 BACKGROUND

The Matchedash Bay area of southeastern Georgian Bay has long been recognized as both a significant waterfowl staging areas and a waterfowl production area. In addition to being a large body of open water situated at the southern edge of the Precambrian Shield, the bay is surrounded by a mosaic of extensive wetlands, upland forest, bedrock outcrops, river systems, and agricultural lands.

Portions of the Matchedash Bay area have been identified as provincially significant Class 1 and 2 wetlands, a provincially significant Life Science Area of Natural and Scientific Interest (ANSI), a Provincial Wildlife Management Area, and important fish spawning and nursery habitats. Other values of the bay relate to its importance for recreational activities (e.g., hunting, angling, trapping, boating, snowmobiling, and nature study) and the presence of significant archaeological/historical resources.

However, despite its many natural and social amenities, Matchedash Bay has recently come under increasing pressure from potentially conflicting land uses, in particular marina and cottage development, drainage alterations, and deteriorating water quality.

For the above reasons, Matchedash Bay was chosen as Ontario's first candidate project under the North American Waterfowl Management Plan (NAWMP), a cooperative agreement between Canada and the United States signed in 1986 (Environment Canada and United States Department of the Interior 1986). One principal objective of the plan is to protect more than 24,000 hectares of waterfowl breeding and staging habitat in the Great Lakes - St. Lawrence lowlands of eastern Canada. Such large scale habitat protection will assist in achieving NAWMP's overall goal, which is to increase North America's breeding duck population to 62 million birds and to bring the continental fall flight to in excess of 100 million birds by the year 2000 (Environment Canada and United States Department of the Interior 1986).

Subsequent to the signing of the bilateral agreement, the Eastern Habitat Joint Venture (EHJV) partnership was established. A technical committee of the EHJV, comprised of representatives of the Ontario Ministry of Natural Resources (OMNR), Ducks Unlimited Canada (DU) and the Canadian Wildlife Service (CWS), formulated a proposal providing a plan for the acquisition, enhancement, and management of wetland habitat for waterfowl in Matchedash Bay (Ontario Eastern Habitat Joint Venture Technical Committee 1988).

As a result of this proposal, Matchedash Bay was selected as the initial project to be carried out in Ontario under the NAWMP.

In 1989, consultants were retained by the Huronia District office of OMNR to (1) conduct a detailed biological inventory of Matchedash Bay and (2) prepare a management plan for the project area. Gartner Lee Limited was awarded the contract to carry out the biological inventory component of the study.

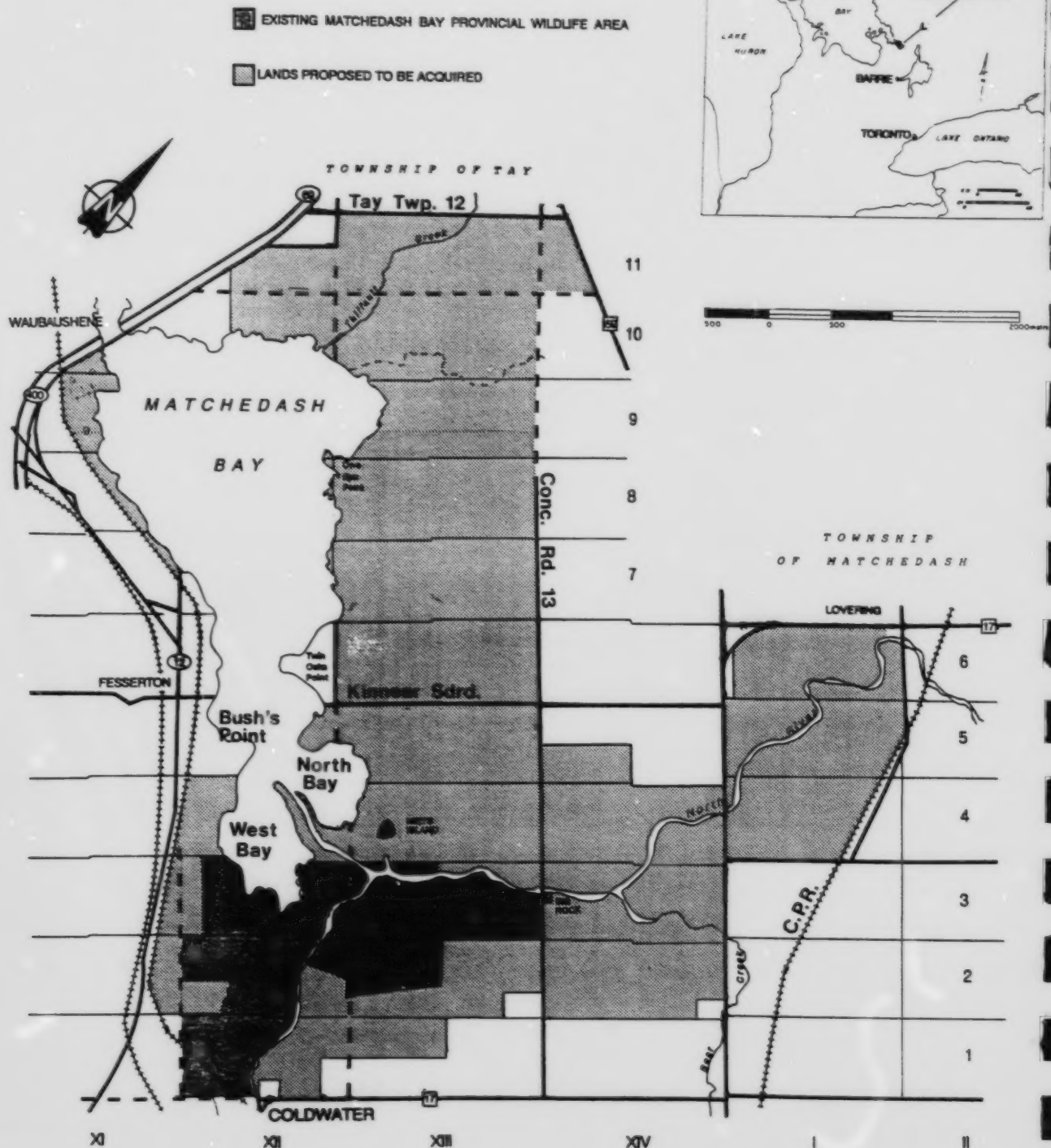
1.2 SCOPE AND OBJECTIVES

1.2.1 Study Area

The Matchedash Bay Provincial Wildlife Area (MBPWA) project area comprises a total of 2,177 hectares and is situated in Tay and Matchedash Townships, Simcoe County, Ontario (Figure 1). The area is roughly bounded on the north by Highway 69 and Tay Township Road 12, on the west by the shoreline of the open water portion of the bay and Highway 12, on the south by the northern boundary of Medonte Township (County Road 17) and on the east by Concession Road 13 and a Canadian Pacific Railway line. The Villages of Coldwater, Fesserton, Waubaushene and the Hamlet of Lovering are situated around the perimeter of the study area.

Matchedash Bay forms the extreme southeastern end of Georgian Bay and is hydrologically connected to a large stretch of open water known as Severn Sound, which lies north of the Highway 69 bridge at Waubaushene.

FIGURE 1 : STUDY AREA LOCATION



Three major watercourses drain into Matchedash Bay, Thiffault Creek from the northeast, the North River from the east, and the Coldwater River from the south (Figure 1).

Since 1981, the OMNR has acquired 283 ha of land in the southern end of the project area. This extensive area of cattail marsh is presently designated as a Provincial Wildlife Management Area (Figure 1).

1.2.2 Study Goal and Objectives

The overall goal of the inventory component of this study is to collect and compile information on the biological and heritage resources of the MBPWA. These data will be used in the formulation of a management plan and will provide a baseline against which the effectiveness of various management techniques can be monitored. To achieve this goal, the study addresses the following specific objectives:

- to describe and map waterfowl use of the area, with particular reference to staging and breeding;
- to describe and map vegetation communities and physiographic features;
- to document past and present biological resources;
- to identify, describe and map significant areas, features and species;
- to define and map areas with constraints to development;
- to evaluate the location and significance of archaeological and historical sites;
- to provide the framework for a monitoring program; and
- to produce a report documenting the findings of the study which satisfies the requirements of the Environmental Assessment Act.

2.0 METHODS

2.1 BACKGROUND DATA COLLECTION

Prior to the commencement of 1989 fieldwork, pertinent background information regarding the physical, hydrological, biological and archaeological resources of the Matchedash Bay area was collected and reviewed. These data were obtained from a wide variety of sources, including:

- published literature;
- unpublished reports and file material housed in government agency offices,
- discussions with government and non-government agency (e.g., Ontario Ministry of Natural Resources, Ontario Ministry of the Environment, Ontario Ministry of Culture and Communications, Ontario Ministry of Food and Agriculture, Canadian Wildlife Service, Water Survey of Canada, Ducks Unlimited) personnel; and
- discussions with knowledgeable individuals (e.g., trappers, botanists, birdwatchers, archaeologists).

Aerial photographs (1978) of the study area at a scale of 1:10,000 were interpreted to delineate physical terrain features, drainage patterns and soil types. More recent (1989) airphotos at a scale of 1:20,000 were analyzed to identify vegetation communities before botanical field work was undertaken.

2.2 FIELDWORK

Field investigations of the MBPWA were carried out from late April to early November, 1989. Visits were scheduled to coincide with peak periods of fish and wildlife activity and the flowering of vascular plants. Specific field data collection methods associated with each major life form studied (i.e., vegetation, waterfowl, other birds, mammals, amphibians and reptiles, butterflies, and fish) and the surface water assessment are provided below.

Vegetation

The botanical component of the biological inventory involved ground-level reconnaissance of representative vegetation communities found within the project area. Within each stand sampled, vascular plant species present in each of four vegetation strata (herb/graminoid, dwarf shrub, shrub, and tree) were recorded. Stands were classified on the basis of broad vegetation class (e.g., aquatic, wetland, forest) and dominant cover type(s).

Additional information recorded for each area surveyed included estimates of vegetation cover, water cover, moss, lichen, litter, fallen wood, bare rock, notes on water flow, water depth, seepage, and drainage; descriptions of surface soil texture, and other incidental observations, including wildlife encountered.

All data were dictated into portable cassette tape recorders in the field. These data were subsequently transcribed onto standardized field forms.

Provisional results of vegetation community classification were related to 1989 air photo imagery at a scale of 1:20,000 through locating sampled stands and extrapolating to evidently similar areas. Oblique, natural colour photography of the study area was obtained in the summer of 1989 by means of a low altitude overflight using a fixed-wing aircraft.

Waterfowl

Counts of staging waterfowl in spring and fall were obtained from low-level helicopter surveys, supplemented by pre- and post-flight ground and boat observations. Strip-transect sampling, which involved counting all waterfowl observed within a series of parallel strips of a fixed width (30 m) was the census method employed. This technique is best suited for sampling large areas (Sen 1982). All wetlands and open water habitat within the study area were surveyed in this manner. The helicopter was flown along the specified transect lines at an approximate altitude of 10-15 m and at a speed of about 50 km/hr. In addition to the pilot, two observers (one on either side of the helicopter) and a navigator/data recorder were used to count waterfowl.

Strip-transect sampling from a helicopter was also the technique used to census waterfowl broods. Two brood counts were carried out, one in mid-July and the other in early August. Aerial transect surveys are one of the favoured census techniques employed by Ducks Unlimited (Nelson and Phillips 1983).

The brood count surveys deviated from the staging surveys in one minor respect. Once a duck brood was located, the pilot was directed to manoeuvre the helicopter as close as possible, prior to rejoining the transect line. This facilitated determining duck species identity, number of young, and plumage class. Plumage class was determined by following the key provided in Gollop and Marshall (1954). Locations of all duck broods encountered were noted on 1:10,000 photomosaic base maps. Aerial transect lines followed during the helicopter survey are also shown on 1:10,000 photomosaic base maps of the study area. These maps are on file at the Huronia District office of the OMNR, Midhurst.

Searches for duck nests were carried out in a variety of marsh, sedge meadow and upland grass meadow habitats. The routes followed are indicated on a 1:10,000 scale photomosaic base map housed in the files of the Huronia District office of the OMNR, Midhurst. A 30 m length of rope with three trailing loops was dragged over the surface of the ground by two people. Several steel rings affixed to each loop served the dual purpose of weighing down the rope and creating a metallic noise intended to scare the female duck off her nest. This technique is recommended by Ducks Unlimited in locating duck nests in dense cover (Gdawski, pers. comm., 1989).

When a hen was flushed from cover by the rope, an intensive search of the area was made to locate the nest. Information on nest location, contents and micro-habitat conditions was recorded. For each marsh/meadow habitat type sampled, estimates of the total area covered were calculated.

Observations of non-waterfowl bird species were made throughout the course of the field season. The presence of wetland species was noted as part of the helicopter and boat surveys. Bird lists were also compiled for each area investigated on the ground.

Evidence of breeding (i.e., possible, probable, confirmed) was noted, following the classification system derived by Cadman *et al.* (1987). Locations of significant bird species were noted on field maps.

Other Wildlife

Observations of mammals, reptiles, amphibians, and butterflies were made throughout the field season. No small mammal trapping was carried out. Specific emphasis was placed on searching for reptiles and amphibians in suitable habitat. Incidental observations of butterflies were made concurrent with the other components of the wildlife inventory. Locations of significant wildlife species were noted on field maps.

Fish

The importance of aquatic habitats as fish spawning and nursery areas was assessed by canoeing the shorelines of Matchedash Bay, North Bay, West Bay, Catfish Bay, and the Coldwater and North Rivers. Shoreline surveys were carried out on several occasions to assess changes in habitat conditions and fish use over the course of the inventory study. Data on substrate type, water depth, temperature and clarity, fish use, and the presence/absence of aquatic vegetation were recorded and mapped.

Since the fisheries resources of Matchedash Bay has already been well documented by previous OMNR studies, it was felt that additional fish collections were unlikely to yield much in the way of new information. However, minnow traps were set in shallow littoral areas to document the presence of young-of-the-year fish.

Surface Water

Data regarding the water quality and hydrology of the MBPWA were obtained from several government agencies. The Great Lakes Section of the Ontario Ministry of the Environment, provided water quality information for existing stations on the Coldwater and North Rivers. The Water Survey of Canada, made available water level and flow records for stations on the Coldwater River, the North River and on the north end of Matchedash Bay at the Highway 69 bridge. These data were used to augment the new information obtained from the surface water monitoring program carried out in 1989.

A surface water monitoring program was undertaken by GLL from May to September, 1989. The water quality of Matchedash Bay was monitored on a biweekly basis at several stations throughout the study area.

The following field measurements were taken at each sampling station:

- secchi disc
- conductivity
- pH
- water temperature profiles
- dissolved oxygen profiles
- Maximum depth.

Observations of the following conditions were also made:

- cloud cover
- air temperature
- water condition
- water colour
- time
- miscellaneous observations.

As part of this program water samples were collected for analysis on a monthly basis. Water samples were submitted to a laboratory and analyzed for total phosphorus and chlorophyll *a* concentrations. Water samples were taken at two times the depth of the secchi disc reading (i.e., the euphotic zone) or one metre above the bottom. Samples were collected using a Kemmer bottle and stored on ice. Water samples were submitted to the laboratory within 24 hours of collection.

A monitoring protocol document was established prior to the initiation of the surface water monitoring program. These protocols are appended to the Field Survey book.

3.0 PHYSICAL SETTING

3.1 BEDROCK GEOLOGY

Matchedash Bay is situated on the geological contact between the middle-to late-aged Precambrian rocks composed of clastic sediments to the north, and the flat lying, younger middle Ordovician limestones of Paleozoic age to the south. Indeed, the existence of the bay probably has some connection with the differential weathering properties between the Precambrian metasediments and the Paleozoic limestones along this contact. Over geologic time, forces have eroded along this contact, allowing in some small way for the existence of the present bay.

3.2 PHYSIOGRAPHY AND SURFICIAL GEOLOGY

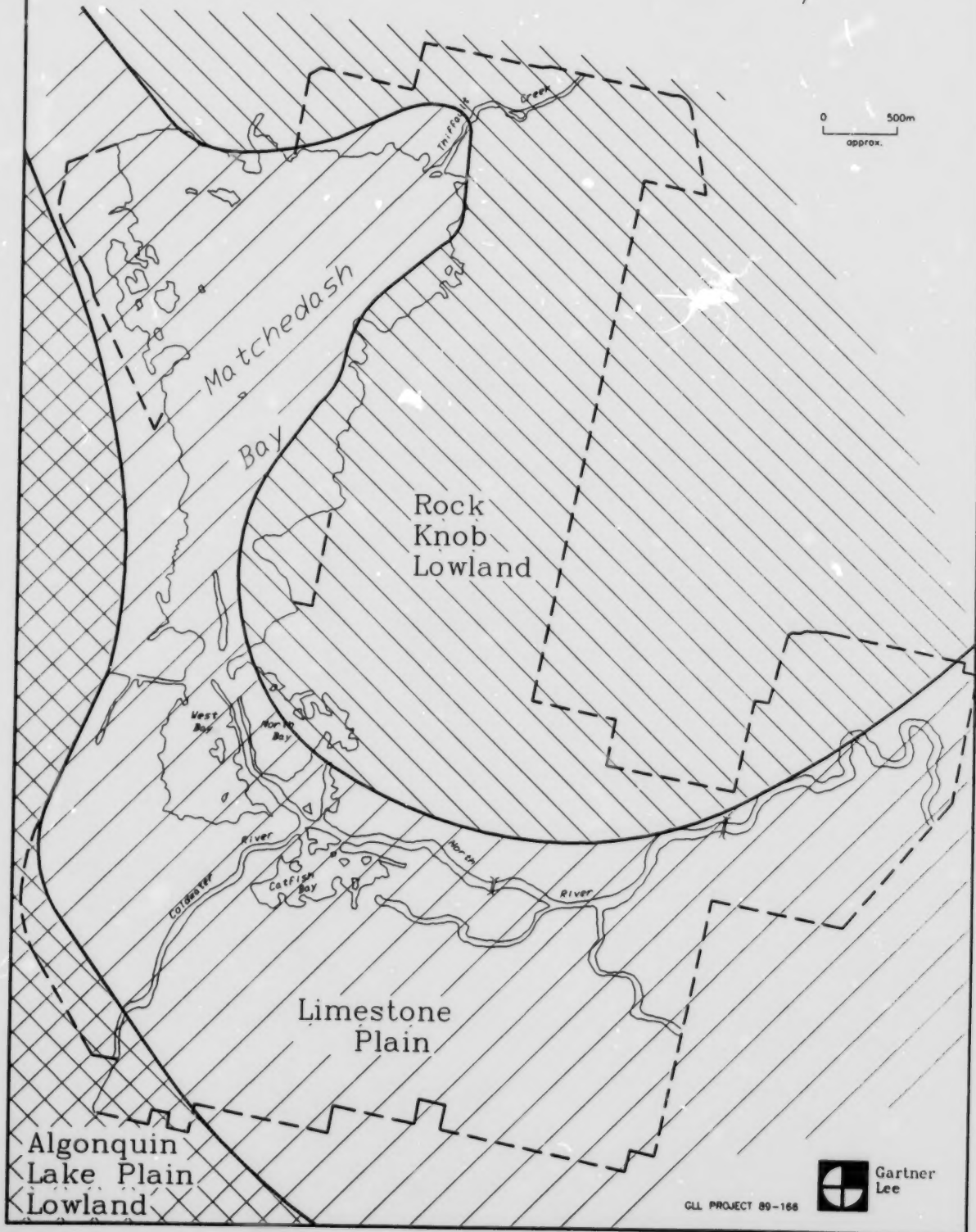
The western part of the MBPWA forms part of what Deane (1950) refers to as the "Algonquin Lake Plain Lowland". (Figure 2). This area correlates to the physiographic region identified by Chapman and Putnam (1984) as the "Simcoe Lowlands". This is an area of silt and clay soils that were deposited in glacial Lake Algonquin. These materials are well drained and form the western boundary of Matchedash Bay. Further to the west of these lowlands, the topography rises to the "Simcoe Uplands" (Chapman and Putnam 1984), which were actual islands during the time glacial Lake Algonquin inundated the area.

Immediately to the east and underlying the bay itself and the organic soils flanking the river, is a "Limestone Plain" (Deane 1950) which correlates to the "Carden Limestone Plain" designation of Chapman and Putnam (1984). This physiographic feature provides the flat and poorly drained terrain for the wetland habitats and surrounding imperfectly drained mineral soil areas that are presently farmed. For the purposes of this study, the northern boundary of the limestone plain is arbitrarily placed several hundred metres north of the North River (Figure 2). Beyond this boundary, the flat, poorly drained farm fields are interrupted by the "Rock-Knob Lowlands" described below.

The far eastern and northern portions of the study area lie within a physiographic division called the "Rock-Knob Lowlands" by Deane (1950) and the "Georgian Bay

FIGURE 2
PHYSIOGRAPHIC REGIONS
(Modified after Deane 1950)

NOTE: Boundaries are approximate.



Fringe" by Chapman and Putnam (1984). This area is characterized by very shallow soil and bare rock knobs and ridges composed of Precambrian granites and gneisses which give a very rugged appearance to the landscape.

This entire Matchedash Bay area was inundated by glacial Lake Algonquin. As a consequence of this flooding, the lake left many legacies. Many of the rock knobs were washed bare by wave action, with the removed soil forming deposits on the flanks of these hills. Within the Limestone Plain, deposits of silts and clays were deposited under the waters of the lake onto the flat lying limestone bedrock, setting the stage for the eventual formation of the organic soils and imperfectly drained sediments that form the present day wetland habitat (Figure 3). On the Algonquin Lakeplain, deeper deposits of silts, clays and sand were deposited on the lake bottom, as sediments were eroded from the adjacent Simcoe Uplands, forming a distinctive geologic boundary to the wetland.

4.0 HERITAGE RESOURCES

4.1 INDIAN SETTLEMENTS

Two known archaeological sites relating to Indian occupation have been recorded within the Matchedash Bay study area by the Ontario Ministry of Culture and Communications (Gray 1989). Both are situated on the present shoreline of the bay. A third Indian site is located just west of Fesserton, along the Algonquin Beach ridge overlooking Matchedash Bay. Although outside the present study area, a brief discussion of this site is included since it represents an Indian encampment on what was once the shoreline of the bay.

There are many more recorded Indian archaeological sites within Concession 10 of Tay Township (Hunter 1989), however these sites are not discussed as they do not relate directly to the Matchedash Bay area.

The three recorded sites are:

- (1) the Bush Point (or Zeidler) Site (BeGw-13)
- (2) the Beighton Site (BeGw-14); and
- (3) the Cronin Site (BeGw-16).

BUSH POINT SITE (BeGw-13)

This site is located approximately 60 m east of the offices at Matchedash Camp in part of Lot 4, Concession 12, Tay Township (Figure 4), formerly known as Bush's Point. It is adjacent to a large rock, and has been damaged by landfill activities. The presence of pottery fragments and chert detritus suggests that this site was used by Iroquoian peoples, likely as a spring and fall hunting and fishing camp.

Testing activities at the site in 1976 (Hunter 1976) obtained 42 artifacts, including faunal remains (see Appendix A). This site has good potential for revealing details of Matchedash Bay history circa A.D. 1500-1600. The artifacts from this site are slightly intermixed with 20th century bottle glass and nail fragments (Hunter 1989).

BEIGHTON SITE (BeGw-14)

This site is located due west of Fesserton, in Lot 5, Concession 12 of Tay Township (Figure 4), up the hill overlooking Matchedash Bay. It is associated with the Algonquin Beach ridge which once formed the old shoreline of the bay. The elevation of the site is 203 m a.s.l., 27 m above the present chart datum level of Matchedash Bay. The site is intact and has only been disturbed by minor gardening activities. Surface collecting carried out in 1976 (Hunter 1976) indicated that this site was of considerable antiquity and probably dated back to 5000-7000 B.C.. A total of 32 artifacts, including chert and quartz scrapers, chert nodules and flakes was recovered.

This site could provide information on the human occupation of Matchedash Bay that extends well into the Archaic period. Unfortunately, very little is known about this time period in the Muskoka-Georgian Bay region (Hunter 1989).

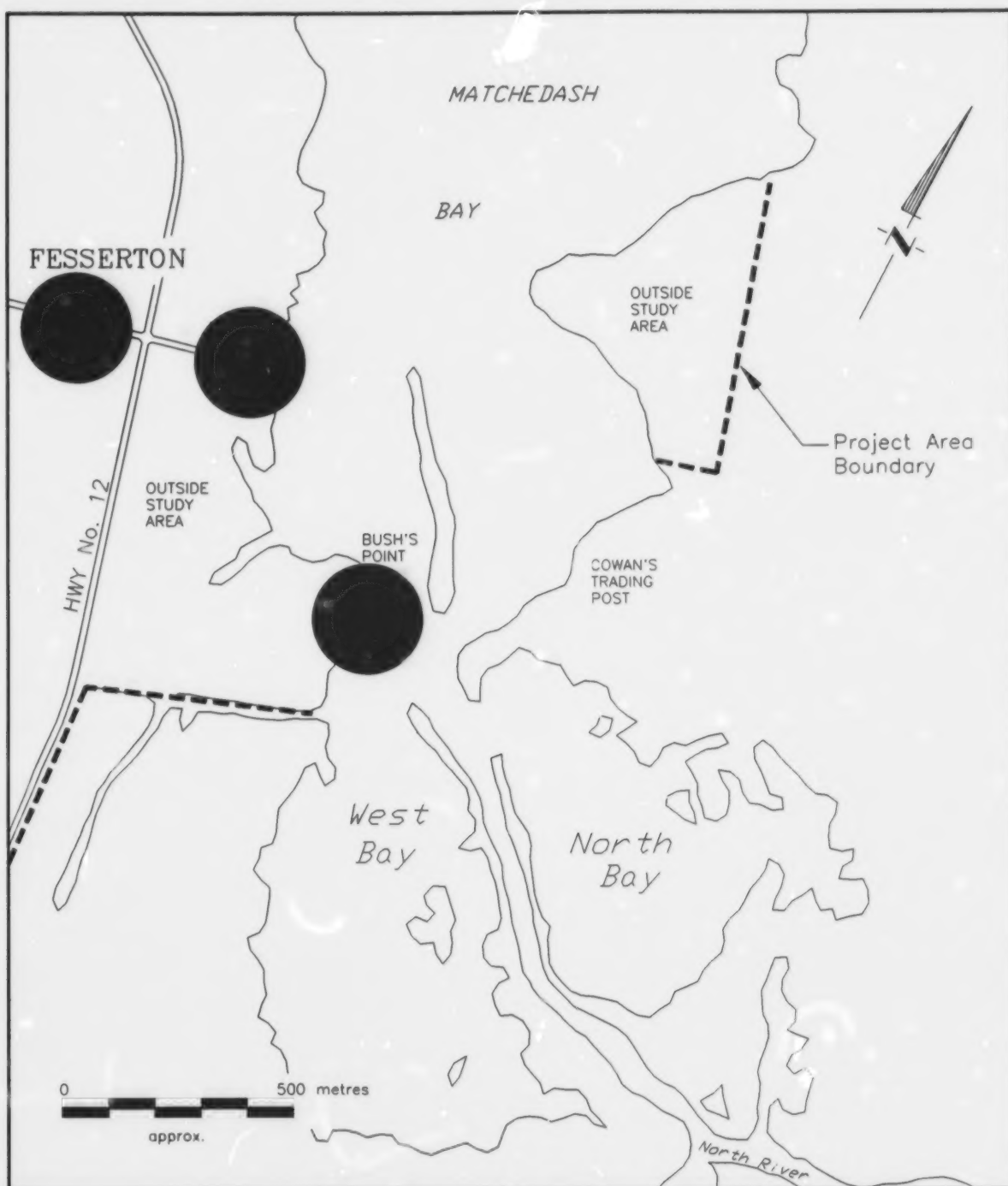


FIGURE 4
SIGNIFICANT ARCHAEOLOGICAL
SITES

Matchedash Bay Provincial Wildlife Area

GLL PROJECT 89-166



CRONIN SITE (BeGw-16)

This site is located just south of a large house at the foot of Matchedash Bay Road on the NE 1/2 of Lot 5, Concession 12, Tay Township (Figure 4). Several pottery sherds were recovered, suggesting that the site dates to the Middle Woodland Period, A.D. 1200-1600. Although only three artifacts were recovered in 1976 (Hunter 1976), the owner, Mr. J. Cronin, had several diagnostic artifacts (slate projectile point, stone pipe bowl) relating to Middle Woodland occupation (see Appendix A).

This area of Matchedash Bay will undoubtedly reveal more data from the Middle Woodland Period, however housing construction has already adversely affected this particular area and likely part of the designated site area (Hunter 1989).

4.2 EUROPEAN SETTLEMENTS

The earliest recorded site of European occupation in the Matchedash Bay area dates back to the late 1700s. In the late 1770s a trading post probably associated with the Mackinac Trading Company was established on the bay by Mr. George Cowan. From historical references (Macdonnell 1891), Cowan's Trading Post, referred to locally as "The Chimneys" (Hunter 1909), was reported to be a well established community, comprised of a number of buildings (i.e., Cowan's house, a store and outbuildings) enclosed within a walled stockade, with wharves and temporary camp sites nearby. The outpost likely covered most of the dry land area of Lot 5, Concession 12, Tay Township (Figure 4). Of "The Chimneys", Hunter (1909:21) wrote that:

"On the shore at that place [opposite Bush's Point] you could see, as the name indicates, an assemblage of old stone chimneys, which marked the dwelling place in the eighteenth century of an Indian trader [Cowan] and his family. About forty acres [99 ha] of a clearing were to be seen before the settlers came, and the stone foundations of some houses, while quite near the shore were the remains of a larger building, and beside it a stone well".

George Cowan played an extremely important role in the early history of Upper Canada. In addition to operating one of the key trading posts along the route linking the cities of Montreal and York with Lake Huron, Cowan governed the Indians of the

southern Georgian Bay area and acted as a liaison between the native people and the governors of Upper Canada (Rusthoven *et al.* 1987).

That Matchedash Bay was an extremely important and strategic point along the canoe route between Lake Simcoe and Georgian Bay is found in J. Johnston's 1809 *Account of Lake Superior* (cited in Hunter 1909:22-23). Johnston wrote that:

"A sure market for provisions could easily be accomplished by opening a communication with the Bay of Matchedash", and that under this scheme the trading post "would soon become the most thriving place in Upper Canada, and the centre of provisions and transport trade for the fur countries".

Cowan drowned in the sinking of the schooner *Speedy*, which was lost in a storm off Kingston Harbour on October 7, 1804. However, several of his children and grandchildren continued to live at the original trading post and likely remained in the service of the Crown until as late as 1834 (Rusthoven *et al.* 1987).

According to Hunter (1989), "The Chimneys" is the most significant late 18th century historical site in Central Ontario. Although a plaque (which is no longer standing) was erected at the site by the Provincial Archaeological and Historic Sites Board in 1953, the archaeological resources of the site are very poorly known. To date, no archaeological research (i.e., excavations or artifact recovery) has been carried out at "The Chimneys". As a result, the site is not officially recognized by the Ministry of Citizenship and Communications as a recorded archaeological site (Gray 1989).

5.0 VEGETATION

5.1 INTRODUCTION

5.1.1 Regional Context of Vegetation

The Matchedash Bay basin is the final inland extension of Severn Sound, which projects southeastward from Georgian Bay of Lake Huron. It is the largest marsh situated on Georgian Bay. Analysis of historical air photos and recorded Georgian Bay water levels

reveals that the marsh/aquatic transition areas of Matchedash Bay undergo prompt and continual change related to these Great Lakes water levels. Different patterns of cattails and bulrush marshes amongst pondweed, water-milfoil and waterlily beds show up on every air photo taken since 1953. By contrast, the woods and farmlands surrounding the bay are slow changing, with the exception of areas influenced by beaver and human activity.

The woodland areas of the MBPWA are similar to many others found throughout a zone known as the Great Lakes-St. Lawrence Forest Region of Canada (Rowe 1972). Comparable habitat in the United States is referred to as the Laurentian Ecoregion (Bailey 1978). Due to the differing scales and definitions inherent in ecological land classification, it has been proposed that this "region" be renamed the Laurentian Ecoprovince (Bobbette 1985).

Under undisturbed conditions, the Laurentian Ecoprovince has mostly treed landscapes dominated (or conditioned) by mosaics of Eastern Hemlock (*Tsuga canadensis*), White Pine (*Pinus strobus*), Sugar Maple (*Acer saccharum*), Eastern White Cedar (*Thuja occidentalis*), Black Ash (*Fraxinus nigra*), Yellow Birch (*Betula lutea*), Basswood (*Tilia americana*), Red Pine (*Pinus resinosa*), Large-toothed Aspen (*Populus grandidentata*) and Black Cherry (*Prunus serotina*). The major world populations of these trees extend across the Great Lakes - St. Lawrence - New England - Acadian area, and all occur in the forests and woodlands surrounding Matchedash Bay.

Matchedash Bay is situated at the uncommonly occurring contact zone between granite shield and limestone bedrock, giving rise to the distinctive "clayplain and granite knob" topography which dominates the area. This, coupled with the transitional and relatively youthful nature of the Laurentian Ecoprovince, results in a situation where significant populations of both typically northern and typically southern plant species occur.

At Matchedash Bay, important tree species with typically northern affinities include Trembling Aspen (*Populus tremuloides*) and Balsam Poplar (*P. balsamifera*), Tamarack (*Larix laricina*), White Spruce (*Picea glauca*), White Birch (*Betula papyrifera*) and Balsam Fir (*Abies balsamea*).

Wide-ranging southeastern North American trees found in the Matchedash area include Red Ash (*Fraxinus pensylvanica*), Red Maple (*Acer rubrum*), Red Oak (*Quercus rubra*) and Bur Oak (*Q. macrocarpa*).

Many other southern species found in the woodlands surrounding Matchedash Bay are at or near the northern limits of their ranges. Some occur as disjunct populations well north of their main concentrations. These southern species include False Mermaid (*Floerkea proserpinacoides*), Blue Phlox (*Phlox divaricata*), Hairy Wild-rye (*Elymus villosus*), Narrow-leaved Spring Beauty (*Claytonia virginica*), Blue Beech (*Carpinus caroliniana*), Hairy Agrimony (*Agrimonia pubescens*), Wild Garlic (*Allium canadense*), a sedge (*Carex cephaloidea*), Small Black Snakeroot (*Sanicula gregaria*), Stout Wood Grass (*Cinna arundinacea*), Cleavers (*Galium aparine*), Wild Licorice (*G. circaeazans*) and Anise-root (*Osmorhiza longistylis*). For some of these plants, their presence in the Matchedash Bay area marks their only known occurrence on the Precambrian Shield (Reznicek 1974).

By contrast, the expansive marshes, aquatics and scrub communities of the Matchedash Bay basin are often dominated by widespread plant species: cattails (*Typha latifolia*, *T. angustifolia*), many pondweeds (e.g., *Potamogeton natans*, *P. zosteriformis*, *P. berchtoldii* and *P. pectinatus*), Arrowhead (*Sagittaria latifolia*), Common Reed (*Phragmites australis*), Canada Blue-joint (*Calamagrostis canadensis*), bulrushes (*Scirpus acutus*, *S. validus*), waterlilies (*Nuphar variegatum*, *Nymphaea odorata*), a water-milfoil (*Myriophyllum exalbescens*), and Common Bladderwort (*Utricularia vulgaris*). These plants are all widespread across central and southern North America. Shrub species that are similarly widespread if not circumboreal, and that comprise a major component of the vegetation of Matchedash Bay, are Speckled Alder (*Alnus rugosa*), Red-osier Dogwood (*Cornus stolonifera*), and several willows (*Salix bebbiana*, *S. serissima*, and *S. lucida*).

Several Laurentian shrub species frequent marshy edges and rocky openings: two willow species (*Salix discolor*, *S. petiolaris*) and Wild Spiraea (*Spiraea alba*). Staghorn Sumac (*Rhus typhina*), Canada Plum (*Prunus nigra*) and Downy Arrow-wood (*Viburnum*

rafinesquianum) are the dominant shrubs in drier upland areas. The few vegetationally important Laurentian marsh and aquatic species present include some asters and goldenrods (e.g., *Aster puniceus* and *Solidago canadensis*), Green Water-milfoil (*Myriophyllum verticillatum*), Marsh Sedge (*Carex lacustris*), Canada Waterweed (*Elodea canadensis*) and Green Burreed (*Sparganium chlorocarpum*).

The aquatic and fluctuating marsh-aquatic communities of the bay are surrounded by relatively more stable cattail marshes. These cattail marshes are interspersed with, or grade upslope into, meadow marshes dominated by either Canada Blue-joint or Marsh Sedge. Along stretches of more abrupt, rocky shoreline these cattail and meadow marsh zones are greatly compressed or altogether absent. Trees are rarely present right up to the shoreline of the bay, in part due to cottage and marina development.

Along the lower North and Coldwater Rivers, the marshes give way to both abandoned and active, cultivated land. At various times in the past and to a limited extent today, livestock browsing has occurred in broadleaf and mixed forest areas near open pastureland.

The current list of vascular plants for the MBPWA (Appendix B) contains 568 species, with about one-fifth of these having been noted to provide 5 % or more plant cover in a given vegetation community.

5.1.2 Vegetation Classification

The capabilities of individual species to survive wide or narrow ranges of environmental conditions can only be accurately observed when viewed in the context of their relationships to an integrated and hierarchical ecological land classification system. A vegetation classification system was developed from this view, using the concept of vegetation class as the highest level of identification. The initial division of vegetation classes variability was into two broad categories; one defined according to the qualities of the vegetation communities themselves, and the other defined according to the evident environmental contexts within which the plant cover occurs.

The latter category includes those plant communities that are subject to relatively continuous or rhythmic disturbance by annually occurring, site-altering activities. These are communities which show great diversity in site and vegetation strata conditions through relatively short periods of time and distance. The vegetation communities that are influenced by these dynamic conditions can be divided into three major types:

- Anthropogenic plant communities dominated or directly supported by human or man-induced activities.
- Coastal plant communities dominated or recognizably influenced by the processes and climate of standing waterbody shorelines and near-shore areas.
- Riparian plant communities dominated or recognizably influenced by the processes and climate of flowing watercourses and their floodplains.

These three community types offer the greatest diversity in terms of vegetation strata. Away from these zones of more intense environmental influence, a less regular, or longer-term cyclical pattern of non-vegetational forces tends to prevail, with the result that species diversity will tend to be stable for relatively long periods of time, or at least more conditional on the actual vegetation present (e.g., succession and canopy generation).

5.2 VEGETATION COVER TYPE DESCRIPTIONS

There are 26 different vegetation cover types represented in the MBPWA (Figure 5). These have been grouped into eight classes on the basis of vegetation strata characteristics:

1. Forest Class Terrestrial and wetland plant communities conditioned by tree strata with 30% or greater cover and tall shrub cover less than 25%, or with 10% to 30% tree cover and 25% or more tall shrub cover.

2. Parkland Class Terrestrial plant communities conditioned by 10% to 30% cover of trees with tall shrubs representing less than 25%.
3. Shrub Class Terrestrial plant communities conditioned by less than 10% tree cover and more than 30% low and/or tall shrub cover.
4. Dwarf Shrub
 - Barren Class Terrestrial plant communities conditioned by dwarf shrub to lichen strata with less than 60% total plant cover on well drained sites, or less than 40% cover on poorly drained sites.
5. Open Upland Class Plant communities conditioned by dwarf shrub to lichen strata with 60% or greater total cover on well drained sites.
6. Open Wetland Class Plant communities conditioned by dwarf shrub to lichen strata with 40% or greater total cover on poorly drained sites.
7. Aquatic Class Plant communities conditioned by herbaceous to algae strata occurring within standing water throughout most of the growing season.
8. Anthropogenic Class Plant communities dominated or directly supported by human or man-induced activities.

Previous botanical work carried out in the Matchedash Bay area (Bobbette 1983a, 1983b) was confined to a 777 ha area around the confluence of the Coldwater and North Rivers in the southern portion of the bay. This study documented the presence of 489 species of vascular plants, of which two were considered rare in Canada (Kershaw *et al.* 1976), three rare in Ontario (Argus and White 1977) and two rare in Huronia District of OMNR (Reznicek and Bobbette 1974) at the time.

All five of the plants originally cited by Bobbette (1983b) as nationally and/or provincially rare are now considered more common and widespread and have thus been delisted. For the purposes of the present study provincial rarity follows the treatment of Argus *et al.* (1982-87). Regionally rare status is based on the list compiled by Reznicek (1987) and adopted by Riley (1989). Reznicek considers a plant to be regionally rare if it occurs in six or fewer locations within Simcoe County; the actual maximum number is modified by the relative intensity of field studies of particular species.

In the following sections, significant plant species associated with each vegetation cover type represented in the MBPWA are listed. These 21 species are summarized in Table 1 and their locations within the project area are noted in Figure 6.

5.2.1 Forest Class

Forest areas occupy approximately 631 ha (29%) of the MBPWA. They generally occur on well drained, upland sites along the eastern side of the bay. Most large forest stands are relatively isolated from the marsh-aquatic complexes. Smaller pockets of bottomland and swamp forest are found in the transition zone between open wetland communities and drier upland areas. Several small wooded "islands" situated on higher granitic outcrops are scattered throughout the expansive marshes in the southern half of the study area.

TABLE 1: SIGNIFICANT FLORA OF THE MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA

COMMON NAME	SCIENTIFIC NAME	STATUS	VEGETATION COMMUNITY	VOUCHER SPECIMEN
Hairy Agrimony	<i>Agrimonia pubescens</i>	RR	1b, 1f	MICH
Wild Garlic	<i>Allium canadense</i>	RR	1f	
Lake Cress	<i>Armoracia aquatica</i>	RR	7a	
Water-starwort	<i>Callitriche verna</i>	RR	7a	
Sedge	<i>Carex alopecuroides</i>	RR	3b	WYE
Sedge	<i>Carex atherodes</i>	RR	6c	MICH
Sedge	<i>Carex crawfordii</i>	RR	7c	WYE
Sedge	<i>Carex merritt-fernaldii</i>	RR	3c, 5a	TRT, WYE
Sedge	<i>Carex umbellata</i>	RR	3c	
Stout Wood Grass	<i>Cinna arundinacea</i>	RR	1g	MICH
Spike-rush	<i>Eleocharis pauciflora</i>	RR	6b	WYE
Spike-rush	<i>Eleocharis rostellata</i>	PR, RR	6b	
Hairy Wild-rye	<i>Elymus villosus</i>	kR	1b, 3b	TRT, MICH
False Mermaid	<i>Floerkea proserpinacoides</i>	RR	1c, 1f	TRT, WYE, MICH
Carolina Cranesbill	<i>Geranium carolinianum</i>	RR	4a	
Green Water-milfoil	<i>Myriophyllum verticillatum</i>	RR	7a, 7b	TRT, WYE
Cancer-root	<i>Orobanchae uniflora</i>	RR	5a	TRT, WYE
Frie's Pondweed	<i>Potamogeton frisesii</i>	RR	7a	TRT, WYE
Smooth Blackberry	<i>Rubus canadensis</i>	RR	1c	TRT, WYE
Bristly Blackberry	<i>Rubus setosus</i>	RR	4a	
Venus' Looking Glass	<i>Triodanis perfoliata</i>	RR	4a	

RR - Rare in Simcoe County (6 or fewer stations) (Reznicek 1987).

PR - Rare in Ontario (Argus et al. 1982-87).

Voucher Locations

TRT - University of Toronto, Toronto

WYE - Wye Marsh Wildlife Centre, Midland

MICH - University of Michigan, Ann Arbor

1a. Ash dominant

This is one of the most common forest types represented in the MBPWA (Figure 5). Several small, pure, closed canopy stands dominated by Red Ash are found growing on wet-mesic to very wet silts and clays, particularly along the northwest shore of the bay. Open-canopied ash woodlands are more prevalent than pure ash forests, and generally contain a mix of other broadleaf species, including Red Maple, American Elm, and Balsam Poplar.

Open ash woodlands possess a dense ground cover stratum, except where shaded by heavy shrub growth. The understory component is dominated by Highbush Cranberry (*Viburnum trilobum*), Nannyberry (*V. lentago*), Red-osier Dogwood, Speckled Alder, and ash saplings.

The ground cover stratum in some stands is comprised of dense sedges or grass; in others it is a complex of robust forbs, grasses, sedges, and ferns. Species that dominate the ground cover include Canada Goldenrod (*Solidago canadensis*), Rough Goldenrod (*S. rugosa*), Canada Blue-joint, Fringed Loosestrife (*Lysimachia ciliata*), Marsh Fern (*Thelypteris palustris*), Sensitive Fern (*Onoclea sensibilis*), Ostrich Fern (*Matteucia struthiopteris*), and several sedges (e.g., *Carex bebbiana*, *C. vulpinoidea*, *C. crinita*, *C. intumescens*).

Some ash stands, particularly in the southwest corner of Matchedash Bay, exhibit a considerable degree of die-off due to natural flooding associated with periodically high water levels.

1b. Oak dominant

Oak-dominated woodland/forests generally fall into two types: those dominated by Bur Oak on mesic to wet silts and clays and those dominated by Red Oak on dry to wet-mesic till and silts overlying low granitic bedrock knolls. Eight small oak-dominated stands occur in the MBPWA (Figure 5). They are generally very open, comprised of large mature trees, and usually contain lesser amounts of Basswood and Red Maple.

The chief components of the shrub layer are Basswood saplings and Nannyberry. The ground cover stratum is often dominated by White Trillium (*Trillium grandiflorum*), Fringed Loosestrife, and Virginia Waterleaf (*Hydrophyllum virginianum*).

Significant Species: Hairy Agrimony and Hairy Wild-rye, two regionally rare plant species, are associated with oak woodland stands (Figure 6).

1c. Maple dominant

Maple-dominated stands are the second most common forest/woodland type found in the MBPWA. Included in this designation are Sugar Maple forests, Red Maple forests, and mixed broadleaf forests dominated by maples. Sugar Maple forests form pure stands on dry-mesic to wet-mesic tills and silts, while two large stands dominated by Red Maple are found on wet-mesic to very wet silts and clays in the extreme northeast corner of the study area (Figure 5).

Significant Species: The regionally rare False Mermaid forms a dominant component of the ground cover stratum in several Sugar Maple stands. One other regionally rare plant, Smooth Blackberry (*Rubus canadensis*), is found in a small maple - dominated stand in the extreme eastern end of the study area (Figure 6).

1d. Aspen dominant

Balsam Poplar and, to a lesser extent, Trembling Aspen are the dominant tree species in several large blocks of mixed forest situated along the east side of Matchedash Bay (Figure 5). Sub-dominant overstory species occurring in the wetter Balsam Poplar-dominated stands include Red Ash and Red Maple. Soils are characterized by wet-mesic to very wet silts and clays. The composition of the shrub and ground cover strata is quite similar to that found in ash-dominated stands.

1e. Willow dominant

Woodland communities dominated by willow are poorly represented in the MBPWA. Two small pockets containing a mix of Pussy Willow (*Salix discolor*), Peach-leaved Willow (*S. amygdaloides*) and Slender Willow (*S. petiolaris*) occur in the southwest corner of the bay (Figure 5). A riparian community of Pussy Willow and Crack Willow

(*S. fragilis*) lines both banks of the Coldwater River. Willow-dominated woodlands contain a dense ground cover of Touch-me-not (*Impatiens capensis*), Field Horsetail (*Equisetum arvense*), and sedges (*Carex gracillima*, *C. lacustris*).

1f. Mixed deciduous

Collectively, mixed broadleaf forests, woodlands and riparian habitats represent the largest forest cover type in the MBPWA. The most discernable cover types are characterized as a Basswood-Bur Oak-Sugar Maple continuum found on mesic to wet silts and clays around the lower slopes of bedrock knolls, often situated close to the marsh edge, and a Sugar Maple-Red Oak-Trembling Aspen-Black Cherry-White Birch association situated on dry to wet-mesic silts and tills. Blocks of mixed deciduous forest of varying sizes are found throughout the southern and eastern portions of the study area (Figure 5). Within these areas, particularly south of Kinnear Sideroad, smaller pockets of more open mixed broadleaf woodlands dominated by Basswood occur. The overstory stratum of this cover type also contains aspen, Red Ash and Red Maple. The sapling, shrub and groundcover strata are very rich, with colony-forming plants such as Sensitive Fern, Ostrich Fern and Fowl Manna Grass (*Glyceria striata*) dominating the forest floor.

Significant Species: Three regionally rare plant species, Wild Garlic, False Mermaid and Hairy Agrimony are associated with, but not restricted to, mixed deciduous forest stands (Figure 6).

1g. Cedar-Tamarack dominant

A large swamp forest stand co-dominated by Eastern White Cedar and Tamarack is found in the southwest corner of the MBPWA (Figure 5). An open Tamarack woodland cover type occurs on the margins of this coniferous swamp. Small, permanent pools of standing water are found throughout this area of wet, organic (peat) soil. Examples of Red Maple, Black Ash, White Birch, and Balsam Fir are also present. The shrub layer is diverse, with saplings of the above mentioned trees, Speckled Alder, Dwarf Raspberry (*Rubus pubescens*), and Alder-leaved Buckthorn (*Rhamnus alnifolia*) notable throughout. Dominant elements of the ground cover include Sensitive Fern, Three-leaved and Starry False Solomon's-seal (*Smilacina trifolia*, *S. stellata*), Wild

Sarsaparilla (*Aralia nudicaulis*) and sedges (e.g., *Carex disperma*, *C. leptalea*, *C. interior*). A significant moss stratum is present, achieving 40-60% ground cover in places. As is the case with ash-dominated woodlands, tamarack woodlands show evidence of die-off due to localized flooding.

Significant Species: Stout Wood Grass (*Cinna arundinacea*) was found growing in the cedar-tamarack swamp (Figure 6). This species is rare in Simcoe County.

5.2.2 Parkland Class

Parkland vegetation is differentiated from woodland and forest types by the amount of tree cover (10-30%) present. Parkland stands derive their open character from tree cutting and grazing activity. This vegetation class comprises less than 1% of the MBPWA, being confined to one small unit abutting the unopened Concession 13 road allowance which marks the project area's eastern boundary (Figure 5).

2a. **Deciduous parkland**

A mixed broadleaf parkland stand dominated by Basswood is situated on dry, sandy terrain. The ground cover stratum is characterized by mixed forbs and grasses which are similar in composition to those found in Open Upland and Barren situations. These include Canada Goldenrod, Wild Strawberry (*Fragaria vesca*) and Poverty Oat Grass (*Danthonia spicata*).

5.2.3 Shrub Class

Shrub communities (encompassing areas with less than 10% tree cover and more than 30% shrub cover) are of widespread distribution throughout the MBPWA (Figure 5) and provide important nesting cover and forage for wildlife.

3a. **Hawthorn dominant**

An old field community which has been invaded by hawthorn (*Crataegus* spp.) is situated just east of "The Chimneys" site (Figure 5). Historically, this area was once cleared of native vegetation and has been subject to the influence of livestock grazing since then. This hawthorn stand provides nesting habitat for several significant upland bird species known to occur in the Matchedash area (see Section 6.3.1).

3b. Willow dominant

Willow is one of the most widespread shrub cover types found in the MBPWA, often forming an intermediate zone between marsh and forest habitats (Figure 5). These stands grow in wet soils and are dominated by Slender Willow, Pussy Willow, and Bebb's Willow (*Salix bebbiana*). Speckled Alder and Red-osier Dogwood are occasionally present as sub-dominants of the overstory and understory strata. Willow shrub stands show evidence of having been subjected to periodic fires, resulting in standing dead trees, repressed growth, and a high incidence of die-back. The ground cover stratum is typically comprised of dense mix of Canada Blue-joint, Water Horsetail (*Equisetum fluviatile*) and numerous sedges (e.g., *Carex stricta*, *C. comosa*, *C. lacustris*).

A small riparian alder-willow shrub community occurs in association with a small, unnamed stream in the southwest corner of the study area (Figure 5).

Significant Species: The regionally rare Hairy Wild-rye and a regionally rare sedge (*Carex alopecoidea*) occur in willow-dominated shrub communities (Figure 6).

3c. Mixed-deciduous shrub

Mixed deciduous shrub is the most commonly represented shrub cover type, occurring on dry to wet-mesic sites. The largest stands are found along the eastern shore of the bay (Figure 5). Chokecherry (*Prunus virginiana*), Wild Spiraea and Red-osier Dogwood grow along the moister marsh edge extremes. Scrub oak and Basswood, with lesser amounts of Staghorn Sumac, Downy Arrow-wood and Red-berried Elder (*Sambucus pubens*) inhabit drier, bare rock knolls.

Significant Species: Three regionally rare species, Wild Garlic and two sedges (*Carex merritt-fernaldii*, *C. umbellata*), occur in stands of mixed deciduous scrub.

5.2.4 Dwarf Shrub-Barren Class

4a. Granitic Rocklands

This class of vegetation is restricted to exposed granitic knobs and ridges. Barren communities include areas of inland dwarf shrub and rocky shorelines. Two discrete "islands" of dwarf shrub-barren vegetation occur to the north of Thiffault Creek (Figure

5). Elsewhere, this cover type exists as small, bare patches or clearings intermingled among more extensive shrub and woodland habitats. Due to the small size of these areas some have not been differentiated from the dominant forest cover type in Figure 5. The dwarf shrub component of these barrenlands are stunted trees and shrubs which have invaded from surrounding shrub and woodland habitats. Distinctive plants associated with these areas include Early Saxifrage (*Saxifraga virginensis*), Pale Corydalis (*Corydalis sempervirens*), and Douglas' Knotweed (*Polygonum douglasii*). Typical dryland species are represented by Poverty Grass, Hair Grass (*Deschampsia flexuosa*), Sheep Sorrel (*Rumex acetosella*), Bicknell's Geranium (*Geranium bicknellii*) and Dryland Goldenrod (*Solidago hispida*).

Rock shoreline barrens exhibit the most abrupt transition from wet to dry conditions. Herbaceous forms, including Canada Blue-joint, burreed (*Sparganium* sp.), two bulrushes (*Scirpus validus*, *S. acutus*), and Purple Loosestrife (*Lythrum salicaria*) grow near the water's edge. Further inland, a mix of mesic and xeric tree and shrub species take over. Waterloving species such as willows, Red Ash, and American Elm, along with Red Maple and Manitoba Maple (*Acer negundo*), grow interspersed with drier species, including Staghorn Sumac, Ninebark (*Physocarpus opulifolius*), Sugar Maple and Red Oak.

Significant Species: Carolina Cranesbill (*Geranium carolinianum*), Bristly Blackberry (*Rubus setosus*), and Venus' Looking Glass (*Triodanis perfoliata*) are associated with small rock barrens in the northeast corner of the MBPWA (Figure 6). All three of these species are rare in Simcoe County (Reznicek 1987).

5.2.5 Open Upland Class

The presence of open upland vegetation within the MBPWA appears to be largely the result of clearing and grazing activity and in part represents a reversion from areas of former cultivation.

5a. Upland Meadow

This cover type is characterized by a general successional trend from abandoned hay pasture, which is comprised of a relatively simple association of hay species and a few weeds, through to a more complex upland mixed forb-grassland association.

Hay pastures comprise much of the marginal agricultural land around the perimeter of the southern cattail marsh (Figure 5). These areas are maintained at an edaphic climax state through periodic mowing and occasional cultivation and seeding when lower water levels in the marsh permit.

Upland mixed forb-grasslands are more diverse, with Canada Goldenrod, Yarrow (*Achillea millefolium*), Wild Bergamot (*Monarda fistulosa*), Wild Strawberry, and Rough-fruited Cinquefoil (*Potentilla recta*) occurring in association with invading shrubs and trees such as Red-osier Dogwood and Red Ash.

Significant Species: Two regionally rare plant species, Cancer-root (*Orobanche uniflora*) and a sedge (*Carex merritt-fernaldii*), occur in upland grassland meadows.

5.2.6 Open Wetland Class

Collectively, open wetland cover types occupy approximately 461 ha (21%) of the MBPWA. These types include meadow marsh, sedge fen, and cattail and mixed marshes.

6a. Meadow Marsh

Meadow marshes occur around the drier fringes of the extensive *Typha* marshes and are also interspersed with the wetter, often floating, portions (Figure 5). This wetland cover type is usually dominated by grasses (e.g., Canada Blue-joint, Common Reed, and Reed Canary-Grass (*Phalaris arundinacea*)), or sedges (e.g., *Carex lacustris*, *C. stricta*). These species often form pure stands or colonies, although mixtures of several or all occasionally occur. Although cattail is a minor component of the meadow marsh, conditions are slightly too dry to support extensive amounts of these robust emergents. Minor shrub incursions by Red-osier Dogwood, Pussy Willow and Wild Spiraea are sometimes evident but generally form less than 5% of the cover.

6b. Sedge fen

The sedge fen cover type is restricted to one small stand in the southwest corner of the MBPWA (Figure 5). The fen occurs on saturated peat through which calcareous ground water seeps. Approximately 10% of the fen is covered with ponded shallow water. Marl encrustation is evident on the vegetation.

Relatively rich herb and shrub strata exist, with Twig Rush (*Cladium mariscoides*), reed, bulrush, and sedges (including *Carex limosa* and *C. interior*) included among the dominant species. Other typical fen indicators which occur include *Carex sterilis*, Bedstraw (*Galium labradoricum*), Golden Ragwort (*Senecio aureus*), and Loesel's Twayblade (*Liparis loeselii*).

Eastern White Cedar, Tamarack and Shrubby Cinquefoil (*Potentilla fruticosa*) are dominant among the approximately 12 woody species which grow in the fen.

Significant Species: Two significant species of Spike-rush are found in the fen (Figure 6). *Eleocharis rostellata* is both regionally rare and provincially rare (Ball and White 1982), while *E. pauciflora* is considered regionally rare (Reznicek 1987).

6c. Cattail marsh

The extensive cattail marshes of Matchedash Bay are dominated by Broadleaf Cattail (*Typha latifolia*), Narrowleaf Cattail (*T. angustifolia*) and a hybrid strain of the two (*Typha* X *glauca*). The latter presently dominates much of the marsh.

Cattail marsh is the most common and dynamic of the wetland cover types represented in the study area. Although its distribution has undergone change in response to fluctuating water levels, cattail marsh consistently occupies the zone between the meadow marsh and aquatic communities (Figure 5). Narrowleaf and Hybrid Cattail stands occur in slightly deeper water than Broadleaf Cattail and are relatively more stable communities. Pockets of burreed (*Sparganium* sp.) and bulrush (*Scirpus* sp.) marsh are found among the cattails. Some important associates (none of which can be considered sub-dominant) of the slightly more diverse cattail marsh edge include

Stinging Nettle (*Urtica dioica*), Touch-me-not, Water horehounds (*Lycopus uniflorus*, *L. americanus*), and Marsh Fern.

Significant Species: The regionally rare sedge (*Carex atherodes*) is a locally important dominant of the cattail marsh, especially south of the Concession Road 13 bridge over the North River (Figure 6).

6d. Mixed marsh

Cattails are generally absent or at best represent a very small element of the mixed marsh cover type. Dominant species are typically of the forb-grass type, with some aquatic species also present. Canada Goldenrod, Narrow-leaf Goldenrod (*Solidago graminifolia*), Joe-pye-weed (*Eupatorium maculatum*) and Boneset (*E. perfoliatum*), with Canada Blue-joint, bulrushes, and Pickerelweed (*Pontederia cordata*) are dominant elements of the vegetation. Invading shrubs of willows and Speckled Alder occur.

5.2.7 Aquatic Class

Aquatic communities comprised of submergent vegetation are found throughout the 442 ha of open water which represents approximately 20% of the MBPWA (Figure 5). More complex, floating and emergent stands are found along shorelines, around the perimeter of small rocky islands, and especially at the transition zone between open water and robust emergent marsh habitat.

7a. Submersed aquatics

This vegetation type is made up of relatively pure beds of water-milfoil (*Myriophyllum* spp.), Eelgrass (*Vallisneria americana*), and Canada Waterweed (*Elodea canadensis*). These dominant submergents are usually found within a more complex association, including stonewort (*Chara* sp.), several pondweeds (e.g., *Potamogeton richardsonii*, *P. zosteriformis*, *P. pectinatus*, *P. crispus*) and Bushy Naiad (*Najas flexilis*).

Significant Species: Four regionally rare plant species are associated with the submersed aquatic community (Figure 6). These are: Lake Cress (*Armoracia aquatica*), Water-starwort (*Callitriche verna*), Green Water-milfoil and Frie's Pondweed (*Potamogeton friesii*).

6b. Floating aquatics

Floating aquatic types are simply divided into stands dominated by Bullhead Lily (*Nuphar variegata*) and those containing a mix of Bullhead and White Water Lilies (*Nymphaea odorata*). Except in those places where the floating lily pads form a dense cover, these stands usually contain a thick stratum of submersed aquatics. Common Bladderwort and Water Beggar's-ticks (*Bidens beckii*) were also noted in this cover type.

Significant Species: The regionally rare Green Water-milfoil also occurs in association with floating aquatics.

7c. Emergent-mixed aquatics

Emergent aquatic vegetation forms a transitional continuum from open water to marsh edges. This community type is dominated by colonies of Hardstem Bulrush (*Scirpus acutus*), Pickerelweed, and/or cattail forming both loose emergent and well developed floating and submersed strata. The above emergents, including burreed, are found in a variety of pure and mixed stands. Burreed-bulrush stands occur around the edges of slightly deeper basins within the marshes.

Significant Species: One of several sedges associated with a mixed-emergent aquatic community (Figure 6), *Carex crawfordii*, is considered regionally rare.

7d. Zizania-Sagittaria dominant

This aquatic community consists of two large beds of Wild Rice (*Zizania palustris*) and Narrowleaf Arrowhead (*Sagittaria rigida*), both confined to the northeast corner of Matchedash Bay, near the mouth of Thiffault Creek (Figure 5). Submersed and floating plants associated with this area include *Potamogeton zosteriformis*, *P. natans*, White Water Lily, Water Beggar's-ticks, Canada Waterweed and watermilfoil.

7e. Shallow water barrens

These are shallow water areas which support relatively little aquatic vegetation. Those plants that are present include pondweed and *Elodea* sp. Much of the aquatic component of Catfish Bay is characterized as a shallow water barren (Figure 5).

5.2.8 Anthropogenic Class

8a. **Cultivated**

Fairly extensive cultivated fields occur in the eastern portion of the study area, associated with the North River valley. Cultivated fields straddle areas of transitional wetland and where abandoned, grade into mixed-forb grassland communities. Agricultural land comprises approximately 420 ha (19%) of the MBPWA.

Grain and hay are the most commonly planted crops. Principal hay species are smooth Brome (*Bromus inermis*), Timothy (*Phleum pratense*), Alfalfa (*Medicago sativa*), and Red Clover (*Trifolium pratense*).

8b. **Conifer plantation**

Three areas of planted conifers containing Red Pine (*Pinus resinosa*) and White Pine are found within the MBPWA (Figure 5). Collectively these plantations represent a very minor component of the area's vegetation.

8c. **Buildings and lawns**

This cover type includes the man-influenced vegetation associated with farm buildings, houses, yards, and driveways. The vegetation of areas was not sampled but probably contains several weeds and ornamental species which have not been reported to occur elsewhere in the study area.

6.0 BIRDS

A total of 169 species of birds is known to have occurred within the Matchedash Bay project area (Appendix C). Of these, 90 are known or suspected of breeding. The remainder represent non-breeding summer visitors, migrants and winter visitors.

The first comprehensive study of the area's avifauna listed 116 species (Van Stam and McLachlin 1982a). The present study documented the presence of 140 species. Records of 14 additional birds were obtained from other sources (see Appendix C).

6.1 WATERFOWL

6.1.1 Breeding

Nest Counts

Waterfowl nest surveys of the Matchedash Bay wetlands were conducted on May 31 and June 1, 1989. A 30 m length of rope was pulled across the ground by two persons in an attempt to flush female ducks off their nests.

A variety of marsh habitats was sampled on May 31 in the wetland area east of the Coldwater River, between the Coldwater Sewage Treatment Plant (STP) and Catfish Bay. The rope was pulled for a distance of 1300 m, covering an area of 39,000 m² (3.9 ha). Four habitat types were covered: dense cattail marsh (37%), sedge marsh (27%), canary grass marsh (23%), and mixed cattail-sedge marsh (13%).

Two duck nests were found on May 31, both belonging to Mallards (*Anas platyrhynchos*) and both containing 8 eggs. One was in dense cattail, the other in mixed cattail-sedge habitat. Although the sample is probably too small to be statistically significant, duck nest density in the southern portion of Matchedash Bay was calculated to be 0.51 nests/ha.

On June 1, a total area of 25,500 m² (2.5 ha) in the northern part of Matchedash Bay was sampled using the rope dragging technique. Slightly more than 1.1 ha of cattail (72%), rush (23%) and sedge (5%) was sampled in the northwest corner of the bay. A 0.4 ha island dominated by low grasses (100%) and 1.0 ha of cattails interspersed with pockets of open water (100%) at the mouth of Thiffault Creek were also censused on June 1. No duck nests were found in any of the three northern plots.

Combining the results from both the north and south parts of the wetland, a nest density of 0.31 nests/ha is obtained. Assuming that 461 ha of suitable marsh habitat were available for nesting dabbling ducks in Matchedash Bay in 1989, this projects to an estimate of 143 nests for the entire project area. However, given the very low sample size ($n = 2$) and the tendency to under record nests by as much as 50% using this

technique (Gollop and Marshall 1954), the accuracy of this estimate must be viewed with extreme caution.

Nesting Habitat

Within the MBPWA extensive areas of potential nesting habitat for dabbling ducks exist. However, under present (i.e., 1989) Georgian Bay lake levels (which are at or near the 100-year mean of 175.8 m a.s.l.), vast portions of cattail/sedge/canary grass marshland with a low degree of interspersed vegetation and open water is found. This is particularly true in the southern end of the bay, an area commonly known as Gray's Marsh. The marshes bordering the North and Coldwater Rivers are currently less than optimal as dabbling duck nesting habitat. These areas are relatively dry and dominated by dense, closed stands of robust, emergent vegetation. Under present conditions these areas are probably less productive as dabbling duck nesting habitat than the margins of Catfish Bay, West Bay, North Bay and the mouth of Thiffault Creek, where the ratio of open water to aquatic vegetation is considerably greater.

Although Mallards are catholic in their selection of nest sites, they often exhibit a preference for upland situations over marsh habitat. As a rule, nests are situated within 100 m of water (Bellrose 1976), although both Mallard nests found in 1989 were at a greater distance than this.

Blue-winged Teal (*Anas discors*) favour graminoid areas (e.g., hayfields and sedge meadows) as nest sites. On average, teal build their nests within 50 m of water, although this distance can range to upwards of 1.5 km (Bellrose 1976). No teal nests were encountered in the 1989 survey.

Wood Ducks (*Aix sponsa*) are cavity nesters, typically utilizing natural holes in bottomland hardwoods (Robb 1985). A shortage of natural nest sites is usually cited as the major factor limiting this species' nesting population (Lowney and Hill 1989). Studies in New Brunswick have reported densities of 5.44 nest sites/ha in suitable habitat (Prince 1968), while in central and southeastern United States the occurrence of suitable cavities is often <1/ha (Lowney and Hill 1989).

No Wood Duck nests were located in the MMPWA in 1989. However, the repeated observations of females in a deciduous woodland flooded by beavers (Lot 5, Concession 13, Tay Township) suggests that this area may be used for nesting. Other, smaller pockets of apparently suitable Wood Duck nesting habitat (e.g., hardwood swamps, beaver ponds, upland woodland) occur within the project area. Extensive areas providing these habitats are found to the north and east of Matchedash Bay, within these areas although the availability of suitable nesting cavities is not known. It is speculated however, that some of the Wood Duck broods observed in Matchedash Bay in 1989 originated outside the project area.

Forested wetlands created by recent beaver activity are also extremely important as prime nest sites for American Black Ducks (*Anas rubripes*) (Diefenbach and Owen 1989).

Brood Counts

Waterfowl brood count surveys of the Matchedash Bay project area were conducted by helicopter on July 11 and August 4, 1989. These surveys revealed the presence of five breeding waterfowl species: Wood Duck, American Black Duck, Mallard, Blue-winged Teal and Green-winged Teal (*Anas crecca*). One additional species, Canada Goose (*Branta canadensis*), was confirmed as nesting in late May, when at least four pairs with young were observed.

Wood Duck, Mallard and Blue-winged Teal broods were observed on both helicopter surveys. Green-winged Teal and American Black Duck broods were noted on the August 4 count. The approximate locations of broods are shown on Figures 7 and 8. Absolute numbers of broods, numbers of young, and average numbers of young/brood are provided in Table 2. The breakdown of waterfowl broods by species and age class for each survey are given in Figures 9 and 10.

Broods unclassified either to species or plumage subclass (age) were converted in order to more accurately calculate production, following the procedure described by Gollop and Marshall (1954). This was done by determining the species and plumage subclass

FIGURE 7

WATERFOWL BROOD COUNT SURVEY Matchedash Bay

July 11, 1989



FIGURE 8

WATERFOWL BROOD COUNT SURVEY Matchedash Bay

August 4, 1989

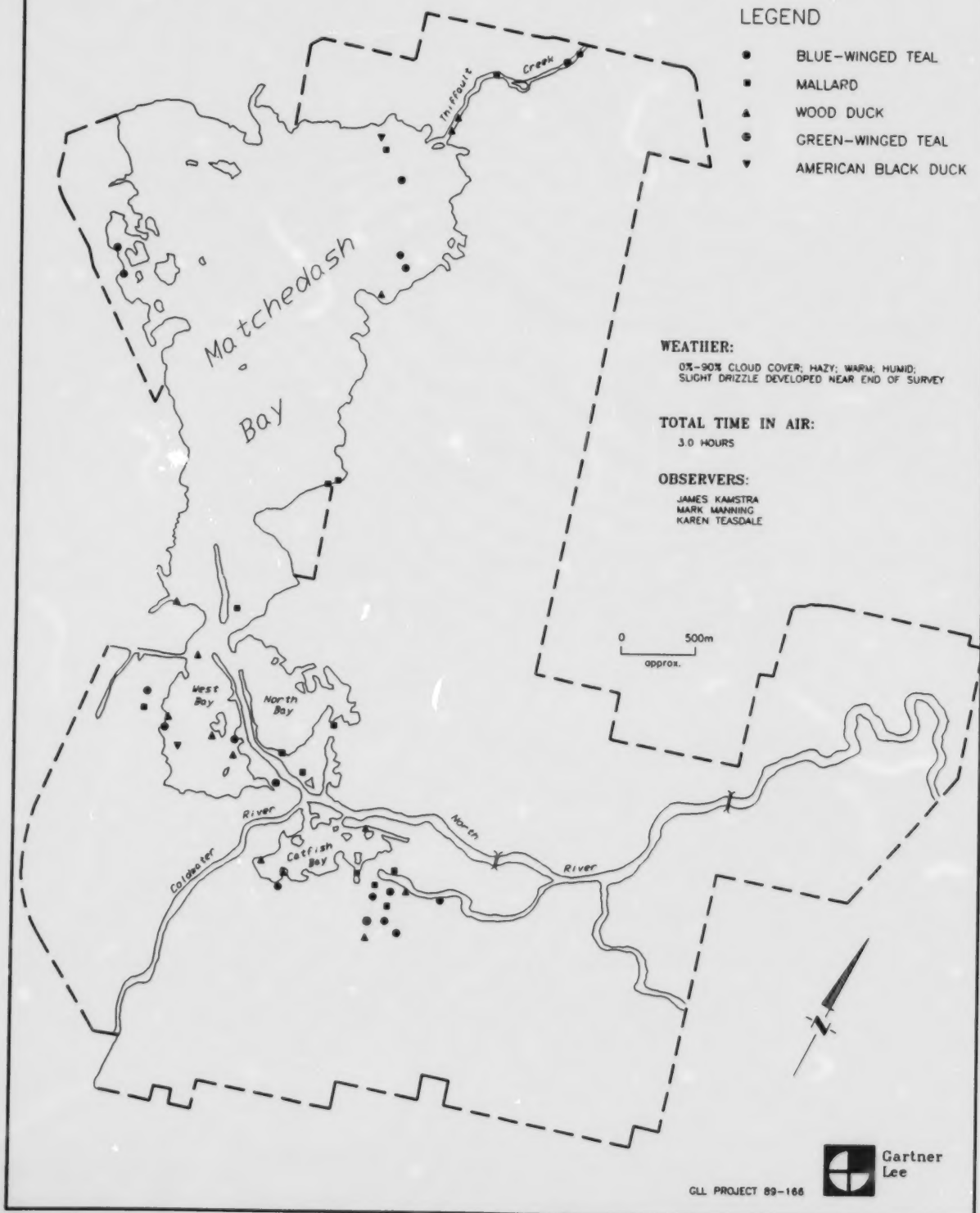


Figure 9

**Age Class Of Waterfowl Broods
Matchedash Bay, July 11, 1989**

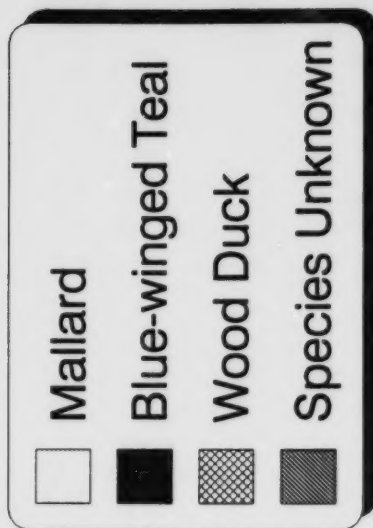
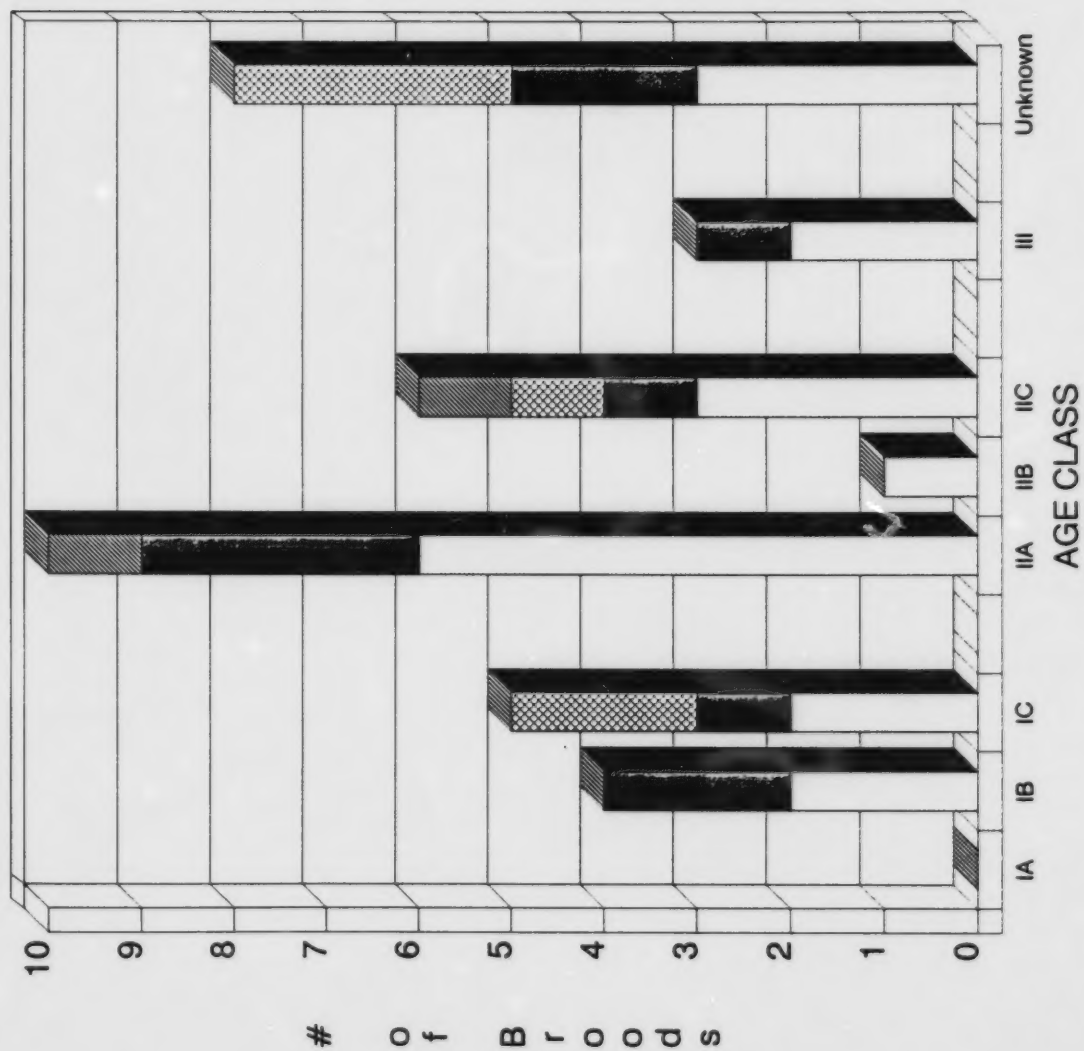


Figure 10
 Age Class Of Waterfowl Broods
 Matchedash Bay, August 4, 1989

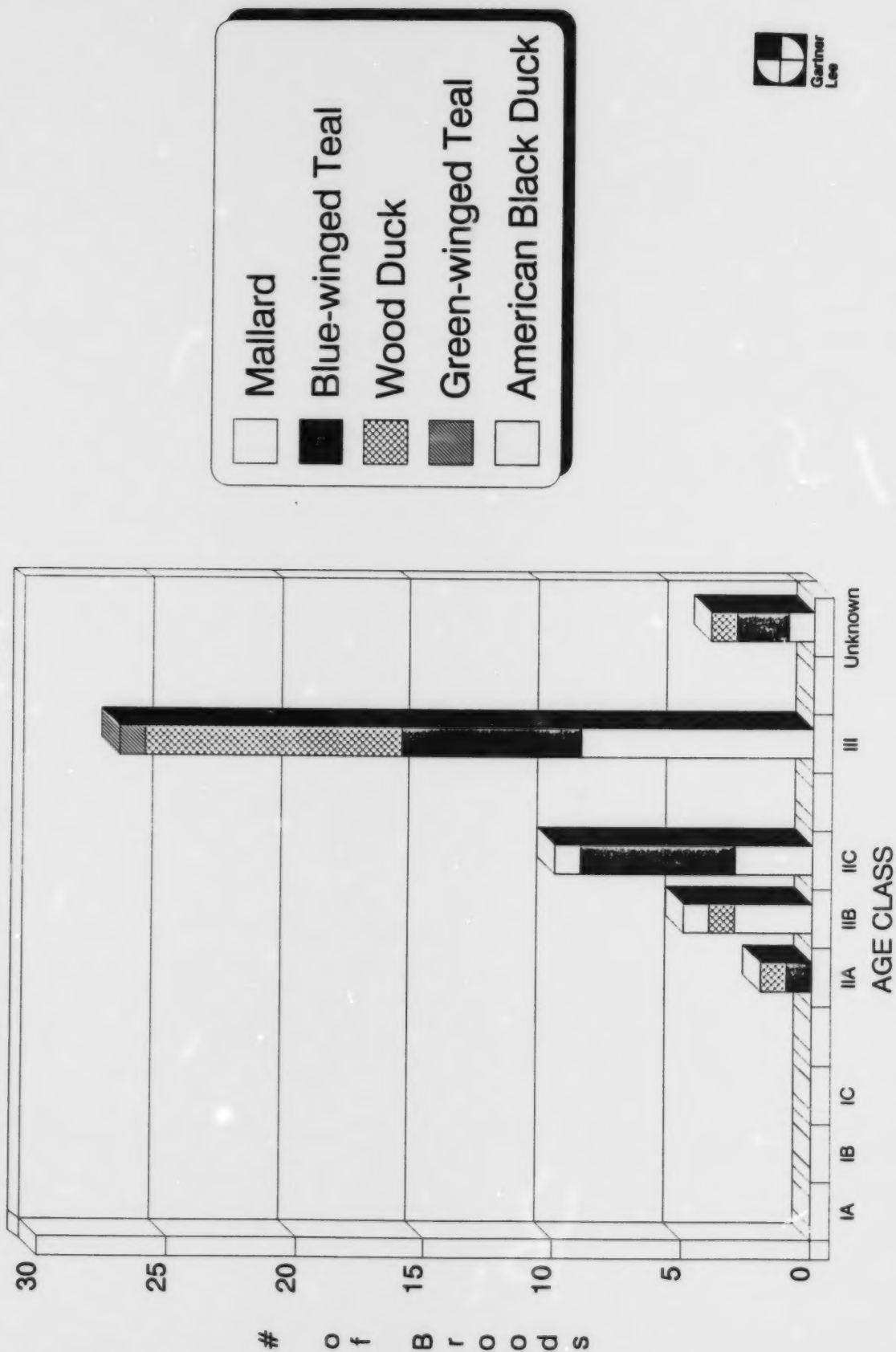


TABLE 2: WATERFOWL PRODUCTION IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA, 1989

SPECIES	DATE	# OF BROODS	# OF YOUNG	# OF AVG./YG/BROOD
Wood Duck <i>Aix sponsa</i>	July 11, 1989	6	11	1.8
	Aug. 4, 1989	13	52	4.0
	Total	19	63	3.3
Green-winged Teal <i>Anas crecca</i>	July 11, 1989	0	0	0.0
	Aug. 4, 1989	1	8	8.0
	Total	1	8	8.0
American Black Duck <i>Anas rubripes</i>	July 11, 1989	0	0	0.0
	Aug. 4, 1989	2	8	4.0
	Total	2	8	4.0
Mallard <i>Anas platyrhynchos</i>	July 11, 1989	19	73	3.8
	Aug. 4, 1989	16	51	3.2
	Total	35	124	3.5
Blue-winged Teal <i>Anas discors</i>	July 11, 1989	10	25	2.5
	Aug. 4, 1989	16	48	3.0
	Total	26	73	2.8
	GRAND TOTAL	83 *	276	3.3

* Absolute brood counts, combining totals from both surveys. Actual estimates of of duck broods (excluding "double counts") are given on page 39.

percentage for classified broods and then applying these figures to the unclassified broods.

Once the above corrections had been applied, duplicate counts were eliminated by 1) counting all broods seen on the initial survey and 2) adding to these only those broods recorded on the subsequent survey whose plumage subclass indicates that they had not been observed on the previous survey. This was done by 1) taking the average (or midpoint) age on July 11 for each plumage subclass by species, 2) adding the number of days elapsed between surveys (i.e., 24), 3) determining the expected number of broods by age and plumage subclass on August 4, and 4) comparing the actual count obtained against the expected count. Any broods which, on the basis of age, could have been double-counted were subtracted. The remaining numbers listed below represent the total number of broods which have been used as a measure of waterfowl production in Matchedash Bay in 1989:

Canada Goose	-	4 broods
Wood Duck	-	19 broods
Mallard	-	20 broods
Blue-winged Teal	-	20 broods
Green-winged Teal	-	1 brood
American Black Duck	-	<u>2 broods</u>
TOTAL	-	66 broods

As Gollop and Marshall (1954) point out, it is important to recognize that these data do not provide a measure of the overall nesting effort of a given species. Rather, it is a measure of the intensity of the successful nesting effort since it does not take failed nesting attempts or duckling predation into account.

Historical Waterfowl Breeding Data

Several formal surveys of breeding waterfowl have been carried out at Matchedash Bay prior to 1989 (Stirrett and Harris 1951; Collins 1974; Dennis 1974; Rombach and Craig 1981). It is virtually impossible to compare population data among the various censuses due to variability in the specific areas sampled and the sampling technique employed

(ground and canoe counts). However, these historical data reveal that the relative species composition of the breeding waterfowl of Matchedash Bay has not undergone any significant change over the past 40 years.

Breeding evidence (i.e., nests with eggs, mated pairs, broods) was obtained for Mallard and Blue-winged Teal in all previous surveys undertaken (Stirrett and Harris 1951; Collins 1974; Dennis 1974; Rombach and Craig 1981). Wood Ducks were present in all but the 1951 survey (Stirrett and Harris 1951).

Although as recently as 20 years ago Devitt (1967:36) considered the American Black Duck to be the "commonest nesting duck" in Simcoe County and lists Waubauskene and Matchedash Township as known breeding areas, this species was not recorded in the 1951, 1971 and 1981 waterfowl surveys. It was considered an "uncommon" summer resident of the bay by Van Stam and McLachlin (1982a). The paucity of breeding records at Matchedash Bay (2 broods in 1989) is indicative of an overall decline in Ontario's American Black Duck population, which is estimated to have decreased by 80% between 1951 and 1981 (Dennis 1987a).

The observation of a female Green-winged Teal accompanying eight young on August 4, 1989 appears to represent the first confirmed nesting of this duck in Matchedash Bay. Devitt (1967:38) gave its status as "rare summer resident", with no definite evidence of breeding in Simcoe Co., while as recently as 1982, Van Stam and McLachlin (1982a) considered the Green-winged Teal to be "rare" in summer at Matchedash Bay. The species has recently undergone a southward extension of its nesting range into southern Ontario and appears to be increasing in numbers (Sandilands 1987).

The Canada Goose is also a recent addition to the breeding waterfowl of Matchedash. Once extirpated as a breeding species from the southern agricultural belt of Ontario, reintroductions in the 1960s have resulted in widespread recolonization of its former range (Lumsden 1981). Geese were reported as nesting in Matchedash Bay but still "uncommon" in summer by Van Stam and McLachlin (1982a). In 1989, at least four broods containing a total of 20 goslings were noted together in the northern end of the bay. As many as 45 geese were observed together during the summer, a number which

probably represents adults and young produced both in Matchedash itself and from adjacent areas.

Although now absent in summer, the Lesser Scaup (*Aythya affinis*) is reported to have once bred at Matchedash Bay (Devitt 1967). The evidence in support of breeding, while suggestive, is not conclusive. In 1939, two pairs were noted as late as June 15 and a pair was observed mating on May 30, 1964 (Devitt 1967). Both of these sightings could involve late spring migrants and Dennis (1987b:92) cautions that "Observations of pair birds and lone drakes are seldom valid indicators of breeding in southern Ontario". Although Lesser Scaups once nested regularly in the larger open water marshes of southern Ontario (Baillie and Harrington 1936), they are now very rare and sparsely distributed south of the Precambrian Shield (Dennis 1987b).

In 1975 and 1976 the Orillia Sportsman's Club released a total of 30-40 Redheads (*Aythya americana*) in Matchedash Bay in an attempt to establish a self-sustaining breeding population (Alison, pers. comm., 1989). There is no indication that these birds, which had been raised in captivity, ever bred successfully.

Although several females from this released stock were shot on the bay in subsequent falls, the entire Redhead population disappeared soon thereafter. Alison (pers. comm., 1989) cited fluctuating Georgian Bay water levels, the tameness of the birds, and their susceptibility to predation by large fish such as northern pike (*Esox lucius*) and muskellunge (*E. maskinongy*) as factors which contributed to the failure of this introduction attempt.

6.1.2 Staging

Spring

A total of 20 waterfowl species was recorded during five spring staging counts conducted in the MBPWA from April 24 to May 17, 1989 (Table 3). Staging counts were made using a combination of ground, boat and helicopter observations.

TABLE 3: SPRING WATERFOWL STAGING COUNTS, MATCHEDASH BAY PROVINCIAL WILDLIFE AREA,
APRIL 24 - MAY 17, 1989

SPECIES	APRIL 24 (GROUND SURVEY)	APRIL 26 (GROUND AND BOAT SURVEY)	MAY 4 (HELICOPTER, GROUND AND BOAT SURVEY)	MAY 10 (GROUND AND BOAT SURVEY)	MAY 17 (BOAT SURVEY)
Tundra Swan				1	
Canada Goose	2	32	24	18	9
Mallard	10	95	49	44	40
American Black Duck			4	4	1
Northern Pintail		10	14		
American Wigeon	250 ±	353	49	22	4
Gadwall		1		2	
Northern Shoveler			6	1	
Blue-winged Teal	2	76	134	51	53
Green-winged Teal	1	55	408	35	6
Wood Duck		6	4	5	7
Canvasback			2		
Redhead			2	8	2
Ring-necked Duck	278	950	136	5	1
Greater Scaup	11				
Lesser Scaup	172	900	1010	98	13
Common Goldeneye		1	2		
Bufflehead	69	292	148	12	3
Common Merganser	22	176	53	2	1
Hooded Merganser	6	6		2	
Total Species	11	14	16	16	12
Total Individuals	823	2953	2045	310	140

The highest number of waterfowl species observed on a single day in the spring (16) was recorded on May 4 and May 10 (Table 3). The highest number of individuals (2953), represented by 14 species, was recorded on April 26 (Table 3).

Since the spring staging surveys did not commence until the third week of April, the peak migration period of several waterfowl species which traditionally pass through Matchedash Bay in the spring was missed. These include American Black Duck, Northern Pintail (*Anas acuta*), Canvasback (*Aythya valisineria*), Redhead, Greater Scaup (*A. marila*), and Common Goldeneye (*Bucephala clangula*). Relatively low numbers were recorded for all of these species (Table 3).

Among spring dabbling ducks, the most prevalent species recorded were American Wigeon (*Anas americana*), Green-winged Teal, Blue-winged Teal, and Mallard. Teal and Mallards were found in small groups along the entire shoreline of the bay or in sheltered pockets of shallow water surrounded by dense marsh vegetation. Wigeon were found in large mixed-species rafts between Twin Oak Point and One Eye Point.

Diving duck species were dominated by Ring-necked Duck (*Aythya collaris*), Lesser Scaup, and Bufflehead (*Bucephala albeola*). The vast majority of Ring-necked Ducks observed were concentrated in a single raft at the mouth of the North River, between Bush's Point and "The Chimneys". Lesser Scaup was the most abundant species encountered and inhabited the central open water portion of Matchedash Bay. Scaup formed large mixed-species rafts with American Wigeon and other diving ducks.

According to Alison (pers. comm., 1989), large concentrations of Common Goldeneyes traditionally stopover on Matchedash Bay in the spring. Goldeneye numbers build up over the last two weeks of March and by early April most birds have moved north. Several late stragglers on April 26 and May 4 were the only goldeneyes seen during the spring staging counts.

One noteworthy observation was that on a single Tundra Swan (*Cygnus columbianus*) on May 10. Unpublished data obtained by Alison (pers. comm., 1989) reveal that around the turn of the century "hundreds" of swans were shot every spring on

Matchedash Bay by local hunters. This tradition apparently died out around the 1920s. Although Tundra Swans are not nearly as common in southern Georgian Bay nowadays, Devitt (1967:32) considered Matchedash Bay to be "a good place to observe these graceful birds". He cites several Matchedash records from the mid-1960s (including a flock of 14 birds) and gives the average spring arrival date in the area as April 15.

Fall

Sixteen species of waterfowl were recorded during four fall staging counts conducted in the MBPWA from August 28 to November 7, 1989 (Table 4). The August 28 survey was carried out by boat; low-level helicopter flights with multiple observers were used to count waterfowl on September 18, October 13, and November 7. The September 18 helicopter survey was scheduled so as to provide an indication of staging waterfowl numbers prior to opening-day of the local duck hunting season (September 23).

The highest number of waterfowl species observed on a single fall count (14) was recorded in October 13 (Table 4). The highest number of individuals (963), representing 11 species, was recorded on September 18 (Table 4).

The period of fall migration for waterfowl using the Great Lakes flyway is much more protracted than in spring, extending from late August to early December. Consequently, several species whose peak numbers traditionally pass through southern Georgian Bay in November were recorded in fairly low numbers (e.g., Northern Pintail, Gadwall (*Anas strepera*), Ring-necked Duck, Common Goldeneye and Bufflehead). No Canvasbacks or Redheads were observed, although according to Alison (pers. comm., 1989) these ducks typically overfly Georgian Bay in the fall.

With the exception of several large flocks of Canada Geese and two Lesser Scaup, all waterfowl recorded on the September 18 survey were dabblers (Table 4). Wood Ducks, Mallards and both species of teal comprised the bulk of the population on this date.

Most Wood Ducks and teal had departed by November 7, when peak numbers of Mallards, American Black Ducks and Lesser Scaup were recorded (Table 4).

TABLE 4: AUTUMN WATERFOWL STAGING COUNTS, MATCHEDASH BAY,
PROVINCIAL WILDLIFE AREA, AUGUST 28 - NOVEMBER 7, 1989

SPECIES	AUGUST 28 (BOAT SURVEY)	SEPTEMBER 18 (HELICOPTER SURVEY)	OCTOBER 13 (HELICOPTER SURVEY)	NOVEMBER 7 (HELICOPTER SURVEY)
Canada Goose	45	126		
Mallard	34	308	188	264
American Black Duck	3	9	7	61
Northern Pintail		1	3	
American Wigeon		15	3	
Gadwall	2	2	1	3
Blue-winged Teal	107	87	1	3
Green-winged Teal	6	88	76	8
Teal sp.		70	112	
Wood Duck	112	255	4	3
Ring-necked Duck			2	
Lesser Scaup		2	278	403
Surf Scoter			1	
Common Goldeneye				8
Bufflehead				9
Common Merganser			29	39
Hooded Merganser				31
Duck sp.			74	25
Total Species	7	11	14	12
Total Individuals	309	963	779	857

The spatial distribution of staging fall waterfowl within the MBPWA was generally similar to that observed during the spring. Groups of dabblers inhabited well protected, backwater areas but tended to congregate in larger, single-species (e.g., teal) or two-species (e.g., Mallards and American Black Ducks) flocks.

After September 18, groups of dabblers were also found in several beaver ponds situated well back from the marsh edges. Rafts of diving ducks (especially scaup) appeared to be more compactly formed and remained further offshore than in the spring. These differences in habitat utilization and flocking behaviour are likely responses to hunting pressure.

The observation of a single Surf Scoter (*Melanitta perspicillata*) on October 13 is of interest. In Simcoe Co., this duck is considered "a rare fall transient" (Devitt 1967:46). The main fall flight of Surf Scoters generally bypasses the Great Lakes, moving from interior breeding grounds down the east side of James Bay to winter on the Atlantic Coast (Bellrose 1976).

Historical Staging Data

Aerial surveys of Matchedash Bay were carried out by the Canadian Wildlife Service in the fall of 1969 (Dennis, pers. comm., 1989). Counts of waterfowl were made from fixed-wing aircraft on September 22 and October 24 of that year.

The results of these surveys (unpublished CWS data) are summarized below:

<u>Date</u>	<u>Species</u>	<u># of Individuals</u>
Sept. 22/69	Mallard	85
	Am. Black Duck	18
	Green-winged Teal	52
	Blue-winged Teal	7

Oct. 24/69	Mallard	35
	Am. Black Duck	21
	Scaup sp.	91
	Unidentified duck	7

These data indicate that waterfowl using Matchedash Bay as a fall staging area 20 years ago were comprised of species similar to those noted in 1989. However, counts made from fixed-wing aircraft tend to underestimate duck numbers due to the higher altitude and faster speeds at which they are carried out. Although it is difficult to draw any meaningful comparisons between the 1969 and 1989 population data, relative numbers of ducks species represented in both years are surprisingly similar.

There is anecdotal evidence which strongly suggests that historically, Matchedash Bay was significantly more important as a waterfowl staging area than today. This information was provided by Alison (pers. comm., 1989), who documented the history of waterfowl hunting in Matchedash Bay for the CWS in the late 1970s. To research his manuscript, which was unfortunately never published, Alison interviewed a number of long-time residents of the Matchedash area (most of whom are no longer living) who could recall hunting conditions in the late 1800s and early 1900s.

Prior to 1908, at a time when duck hunting limits were set at 200 birds/year/person, it was apparently not uncommon for market gunners to achieve their quota in a single day at Matchedash (Alison, pers. comm., 1989). Hunting of this scale was carried out as a commercial operation, with the ducks being sold to restaurants in Toronto. Scaup, Mallards, and American Black Ducks were the species most commonly hunted for in those days.

It appears that habitat conditions which influence waterfowl use have also changed somewhat since the turn of the century. According to Alison's (pers. comm., 1989) sources, huge beds of Wild Rice, an important source of food for dabbling ducks, once grew around the entire margin of the bay. Wild Rice is not as widespread in 1989 and is now restricted to a few small remnant areas in the northeast corner of the bay. (see Section 5.2.7).

6.2 WETLAND BIRDS

Observations of non-anserine (i.e., non-waterfowl) wetland birds inhabiting Matchedash Bay were made concurrently with the 1989 waterfowl surveys. A total of 37 such species was recorded from April 24 to November 7 (Table 5). Of these, 19 are known or suspected of breeding in the study area based on evidence (e.g., nest, fledged young, agitated behaviour, or observations of territorial birds in suitable habitat) obtained in 1989 (Table 5). The remaining 20 species either use the bay during spring/fall migration or are summer visitors which use the area for feeding but breed elsewhere.

6.2.1 Breeding Species

The majority of the 17 non-anserine wetland bird species which presently breed in Matchedash are fairly typical and common inhabitants of large cattail marshes, wet meadows, riparian habitat, and coniferous swamps. These include: Pied-billed Grebe (*Podilymbus podiceps*), Green-backed Heron (*Butorides striatus*), American Bittern (*Botaurus lentiginosus*), Northern Harrier (*Circus cyaneus*), Virginia Rail (*Rallus limicola*), Sora (*Porzana carolina*), Common Moorhen (*Gallinula chloropus*), Killdeer (*Charadrius vociferus*), Spotted Sandpiper (*Actitis macularia*), Common Snipe (*Gallinago gallinago*), Belted Kingfisher (*Ceryle alcyon*), Marsh Wren (*Cistothorus palustris*), and Swamp Sparrow (*Spizella georgiana*).

All of the above species were recorded in the southern end of Matchedash Bay by Van Stam and McLachlin (1982a) and nesting evidence was cited for all but three (Spotted Sandpiper, Common Snipe, and Belted Kingfisher). Nests of Pied-billed Grebes, American Bitterns, Soras, Common Moorhens, and Swamp Sparrows were found during a June 1939 investigation of the Matchedash marshes (Devitt 1967).

Several wetland birds observed breeding in the study area during the waterfowl surveys are provincially and/or regionally significant as nesting species (Table 6). In general, Matchedash Bay is at or near the northern limit of the breeding range of these species in Ontario.

TABLE 5: Wetland Bird Species Observed During Matchedash Bay Waterfowl Surveys, April 24 - November 7, 1989

	April 24	April 26	May 4	May 10	May 17	May 31	June 1	June 20	July 11	Aug 4	Aug 28	Sept 18	Oct 13	Nov 7
Common Loon				1	1			1		14	7	28	9	
Pied-billed Grebe *	5	3		1				1	1					
Horned Grebe	1			1										
Double-crested Cormorant	3	6			3						3	3	1	
Great Blue Heron	2	2	4	10	12		6	24	26	38	27	42	32	11
Green-backed Heron *				1				5			1	7	1	
Black-crowned Night-Heron				1						1		2	1	
American Bittern *			1	1	1			1	14	6	2	12	7	
Least Bittern *									1	3		1		
Turkey Vulture		2	3	5	7	1					3	2		
Osprey	1	1	1							1				
Northern Harrier *		3	1	4					3		2		1	2
Red-tailed Hawk *		2		1	1									1
Rough-legged Hawk														1
American Kestrel *														
Virginia Rail *			3	5	1				3			2		
Sora *			2			2				3		3		
Common Moorhen *			6	4	3			9	12	27	7	13	5	
American Coot *	1	6	8	3					25	8		2	25	25
Sandhill Crane									2		1			
Black-bellied Plover														25

* = Breeds in Matchedash Bay Provincial Wildlife Area

+ = Many individuals observed

TABLE 5: Wetland Bird Species Observed During Matchedash Bay Waterfowl Surveys, April 24 - November 7, 1989

	April 24	April 26	May 4	May 10	May 17	May 31	June 1	June 20	July 11	Aug 4	Aug 28	Sept 18	Oct 13	Nov 7
Semipalmated Plover											4			
Killdeer *		+	+	+	+			+	20	5	10	+	+	2
Greater Yellowlegs	1		20	6										
Lesser Yellowlegs			5	2										
Yellowlegs sp.							1				11	10	5	28
Solitary Sandpiper							10	5	12	10	3			
Spotted Sandpiper *		1	6	1	11		19				4			2
Semipalmated Sandpiper														2
Dunlin		1												2
Ruff		2		3		1			25	+	22	+	70	+
Common Snipe *		40	100	55	48			1	5		33	4		
Caspian Tern	24		3		2		2	4			14			
Common Tern					20			54	23	15				
Black Tern *				4										
Bonaparte's Gull			5	4	5			3		1	6	3		39
Belted Kingfisher *	2	3				12								3
Sedge Wren *				+		+								
Marsh Wren *		+		+	+	+	+	+						
Swamp Sparrow *														

* = Breeds in Matchedash Bay Provincial Wildlife Area

+ = Many individuals observed

TABLE 6: SIGNIFICANT FAUNA OF THE MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA

COMMON NAME	SCIENTIFIC NAME	STATUS	VEGETATION COMMUNITY
BIRDS			
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	PR	7
Least Bittern	<i>Ixobrychus exilis</i>	PR,RR	6c,7b
American Coot	<i>Fulica americana</i>	PR	7
Caspian Tern	<i>Sterna caspia</i>	PR,RR	7
Black Tern	<i>Chlidonias niger</i>	PR	7
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	RR	3a
Loggerhead Shrike	<i>Lanius ludovicianus</i>	NT,PR,RR	3a
Olive-sided Flycatcher	<i>Contopus borealis</i>	RR	1g
Golden-crowned Kinglet	<i>Regulus calendula</i>	RR	1g
Sedge Wren	<i>Cistothorus platensis</i>	RU	6a
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	RU	1c,1e,3c
Orchard Oriole	<i>Icterus spurius</i>	PR,RR	1a
REPTILES & AMPHIBIANS			
Five-lined Skink	<i>Eumeces fasciatus</i>	RR	4a
Milk Snake	<i>Lampropeltis triangulum</i>	RU	4a
Map Turtle	<i>Graptemys geographica</i>	RU	7
Blanding's Turtle	<i>Emydoidea blandingi</i>	RU	1f
Pickrel Frog	<i>Rana palustris</i>	RU	6a

BIRDS

- RR - Rare in Simcoe County - based on status given in Devitt (1967)
and breeding records in Cadman et al. (1987)
- PR - Rare in Ontario - based on Cadman et al. (1987) and ORBBP data (Anon.1989)
- RU - Uncommon in Simcoe County - based on Cadman et al. (1987)
- NT - Threatened in Canada (COSEWIC)

REPTILES & AMPHIBIANS

- RR - Rare in Central Region OMNR (Plourde et al. 1989)
- RU - Uncommon in Central Region OMNR (Plourde et al. 1989)

The Least Bittern (*Ixobrychus exilis*) is a rare breeding species in Ontario (Woodliffe 1987; Anonymous 1989). Since it nests in dense cattail marshes, ideal habitat for this small heron is available in Matchedash. Three adults were observed in the southern half of the bay on August 4, and a juvenile was noted on September 18 (Figure 6; Table 5). The Least Bittern was also observed nesting during the 1982 study (Van Stam and McLachlin 1982a).

Small numbers of American Coots (*Fulica americana*) were observed in the Thiffault Marsh area on most waterfowl counts (Figure 6; Table 5). Coots were also found nesting here in June 1939 (Devitt 1967). This species is generally associated with large cattail marshes, where it favours sections of open, deeper water for nesting purposes (McCracken 1987). The coot population in southern Ontario has apparently declined in recent years, probably as a result of habitat loss. The species is particularly sensitive to fluctuating water levels. It is now considered a rare breeding bird in Ontario (Anonymous 1989).

Although generally considered "locally common" in Ontario (Dunn 1987:192), the Black Tern (*Chlidonias niger*) is included on the list of 58 species of concern to the Ontario Rare Breeding Bird Program (Anonymous 1989). From observations of incubating and territorial birds, it is estimated that 30-40 tern pairs nested in Matchedash Bay in 1989. Nesting was concentrated in two areas, at the mouth of Thiffault Creek and on both sides of the mouth of the North River (West Bay and North Bay) (Figure 6). Black Terns were listed as "common" nesters by Van Stam and McLachlin (1982a). A colony containing an estimated 50 pairs was noted at Fesserton in June 1939 (Devitt 1967).

The Black Tern has very specific nesting habitat requirements, utilizing floating mats of aquatic plants adjacent to shallow open water (Dunn 1979). Like other terns, this species may abandon traditional nesting areas if emergent vegetation becomes too sparse, or too dense, or water levels change dramatically (Dunn 1987).

While not a rare breeder in either Ontario or Simcoe, the presence of nesting Sedge Wrens (*Cistothorus platensis*) at Matchedash is of local significance. This small elusive species is found in several scattered, loose "colonies" in the south end of the study area

where suitable wet sedge meadow habitat exists (Figure 6). On the basis of a breeding bird census carried out in a representative wet sedge meadow plot, Van Stam and McLachlin (1982a) estimated that 20-30 Sedge Wren pairs nested in this area in 1982. The Simcoe Co. status given to this species by Devitt (1967: 118), that of "uncommon summer resident", probably still applies today.

6.2.2 Migrants

Migrant shorebirds utilize exposed mudflats around the edge of Matchedash Bay under seasonally low water level conditions in spring and fall. Relatively low numbers of eight species of migrant shorebirds were recorded in 1989 (Table 5).

A "black" Ruff (*Philomachus pugnax*) was observed off Twin Oaks Point on April 26. This Old World wader is considered a rare visitor in the Great Lakes region of Ontario (James *et al.* 1976). It has apparently not been previously recorded in Simcoe Co. (Devitt 1967; Speirs 1985).

Also of note was a single Sandhill Crane (*Grus canadensis*) heard calling in Gray's Marsh on August 28. This species is a rare migrant in southern Ontario (James *et al.* 1976).

An American White Pelican (*Pelecanus erythrocephalus*), another rare migrant, was seen on Matchedash Bay in May, 1944 (Devitt 1967). The owner of Matchedash Camp in Fesserton reported seeing "a large white bird with a long orange bill" which she believed was a pelican in the summers of 1987 and 1988 (W. Zeidler, pers. comm., 1989).

6.2.3 Summer Visitors

Matchedash Bay is an important resting and feeding area for two fish-eating bird species, Double-crested Cormorant (*Phalacrocorax auritus*), and Caspian Tern (*Sterna caspia*). These species nest together in mixed colonies on the North and South Watcher Islands, situated approximately 40 km northwest of Matchedash Bay in Georgian Bay, Muskoka District. Caspian Terns were noted throughout the summer (Table 5), usually congregated near the mouth of the North River (Figure 6). Cormorants were present in

fewer numbers (Table 5) and were generally observed resting on small rocky islets in the north half of the bay.

Black-crowned Night-Herons (*Nycticorax nycticorax*) were also observed on several occasions in the same area as that favoured by resting Caspian Terns (Figure 6). Although suitable nesting habitat exists for this significant species in the MBPWA there is no other evidence to suggest that Night-herons breed in the area.

Single Ospreys (*Pandion haliaetus*) were observed in the study area on several occasions in the spring and summer of 1989 (Table 5). Although two nesting platforms have been erected just north of One Eye Point, neither shows any evidence of ever having been used by Ospreys.

The presence of cormorants, terns, and ospreys suggests that the fishery resource of Matchedash Bay provides an abundant food source for these birds during their breeding seasons.

6.2.4 Blackbird Roosts

In the late 1970s, researchers at the University of Guelph carried out studies of roosting Red-winged Blackbird (*Agelaius phoeniceus*) populations and their movements in the Matchedash Bay /Coldwater area (Gilbert *et al.* 1979; Somers *et al.* 1981). These studies were precipitated by concerns raised by local farmers regarding crop depredation by blackbirds (Anonymous 1976).

Somers *et al.* (1981) estimated that from 1977-79, the mean number of blackbirds roosting in Matchedash Bay was approximately 105,000. Birds roosted in the late summer and occupied two major areas of cattail marsh (8-10 ha) in the southern portion of the bay. In 1979, Gilbert *et al.* (1979) noted that the areas utilized as roost sites had shifted from previous years, and that the blackbirds were moving upstream along the North River, away from Matchedash Bay.

Aerial, ground and boat surveys in 1989 did not detect the presence of a sizeable Red-winged Blackbird roost anywhere in or immediately adjacent to the project area.

Although blackbirds nest throughout the cattail marshes, they were not noted in unusually high numbers. In late summer and early fall the size of the local breeding population is naturally augmented by blackbirds originating elsewhere but roosts of the size reported by Somers *et al.* (1981) were not observed.

6.3 UPLAND BIRDS

Over half of the 169 bird species known to have occurred in the Matchedash Bay Provincial Wildlife Area (Appendix C) are considered typical upland species. These birds generally occupy forest, field and edge habitats within the project area. For the most part these upland species are representative components of the avifauna of the southern Georgian Bay region and are common and widespread throughout much of southern and central Ontario.

As is the case with the flora and herpetofauna of the area, the upland bird community contains an intermixing of southern and northern elements. Such species as the Upland Sandpiper (*Bartramia longicauda*), Red-headed Woodpecker (*Melanerpes erythrocephalus*), Great Horned Owl (*Bubo virginianus*), Yellow-billed Cuckoo (*Coccyzus americanus*), House Wren (*Troglodytes aedon*), and Field Sparrow (*Spizella pusilla*) are at or near the limit of their Ontario breeding range in the study area. North of the Precambrian Shield the breeding distributions of these species decline abruptly.

Conversely, there are several upland birds known to breed in Matchedash whose principal breeding range occurs to the north, on the shield. These include Broad-winged Hawk (*Buteo platypterus*), Red-breasted Nuthatch (*Sitta canadensis*), Olive-sided Flycatcher (*Contopus borealis*) and Golden-crowned Kinglet (*regulus satrapa*).

6.3.1 Significant Species

Among the upland bird species which presently breed or are known or suspected to have bred in the MBPWA, seven are considered to be significant within a provincial and/or regional context (Table 6).

A pair of Red-shouldered Hawks (*Buteo lineatus*) was observed in the southern portion of the bay in the spring and summer of 1982 (Van Stam and McLachlin 1982a).

Although nesting was not confirmed, evidence of breeding was suggested by the presence of birds in suitable hardwood forest habitat. This raptor has suffered a dramatic population decline throughout much of its range in the past half-century, primarily as a result of widespread habitat loss. Accordingly, the species has been accorded the status of rare in Canada and Ontario (Risley 1982).

A single Yellow-billed Cuckoo was observed in a hawthorn thicket south of Kinnear Sideroad in June 1987 (Figure 6). No other evidence of nesting was obtained. Based on the paucity of atlas records for this southern species in Simcoe Co. (Helleiner 1987) considered (i.e., no confirmed breeding in five squares), it is considered a rare breeder in the county.

Nesting evidence for Olive-sided Flycatchers and Golden-crowned Kinglets was reported in the 1982 avifaunal survey (Van Stam and McLachlin 1982a). In Ontario, these northern inhabitants of spruce-tamarack bogs and coniferous forest are rarely found breeding south of the Precambrian Shield. Atlas data suggest that both are rare breeders in Simcoe Co. (Cheskey 1987; Klinkenberg 1987). Neither species was observed in the summer of 1989.

At least eight territorial Blue-gray Gnatcatchers (*Poliophtila caerulea*) were recorded in the project area in 1989. One pair was reported nesting in 1982 (Van Stam and McLachlin 1982a). Regarded as "a casual visitant" to Simcoe Co. as recently as 1967 (Devitt 1967:125), the Blue-gray Gnatcatcher is probably best described as a regionally uncommon breeding species. Over the past 50 years this species has undergone a considerable northeastern expansion of its breeding range in Ontario (Sutherland and Gartshore 1987), a trend that undoubtedly accounts for the spate of 1989 records.

Although Van Stam and McLachlin (1982a) cite a prior nesting record of the Loggerhead Shrike (*Lanius ludovicianus*) from the southern half of the study area, this species was not observed in either 1982 or 1989. Apparently ideal nesting habitat for this species exists in a grove of hawthorn scrub just east of "The Chimneys". On April 23, 1965 Cattley observed "what was evidently a small migrating flock" of 14 shrikes in this area (Devitt 1967:128). Habitat loss due to intensive agricultural activity and

pesticides have been implicated in the dramatic population decline experienced by Loggerhead Shrikes throughout eastern North America. As a result the species is now considered rare in Ontario (Anonymous 1989) and threatened in Canada (Cadman 1986).

A pair of territorial Orchard Orioles (*Icterus spurius*) was observed on several occasions throughout the summer of 1989. The birds frequented the edge of an oak-dominated woodland on the west side of Concession Road 13 (Figure 6). A typically southern species, the Orchard Oriole was not recorded in any Simcoe Co. square during the breeding bird atlas (Flood 1987). Interestingly, an Orchard Oriole nest found in Waubaushene in 1976 (Mills 1981), just outside the study area, established the first nest record for the county. Given its restricted distribution, the Orchard Oriole is considered rare in Ontario (Anonymous 1989).

7.0 OTHER FAUNA

7.1 MAMMALS

A total of 28 species of mammals has been reported to occur in the MBPWA (Appendix D). The most comprehensive survey of the area's mammals undertaken to date was carried out in the Gray's Marsh/Catfish Bay area by McLachlin and Van Stam (1982). The presence of 25 mammal species was documented in their study (Appendix D). Data were obtained from live trapping, direct field observations, and discussions with knowledgeable individuals (e.g., trappers, naturalists, government agency personnel). Live trapping in 1982 revealed the presence of two species, Masked Shrew (*Sorex cinereus*) and Smoky Shrew (*S. fumeus*), which would otherwise likely have gone undetected.

Mammal trapping was not carried out as part of the 1989 inventory. Incidental observations revealed the presence of 15 mammal species, generally those which are larger and more conspicuous (Appendix D).

Muskrats (*Ondatra zibethicus*) are abundant inhabitants of Matchedash Bay. With the exception of 1982, annual Muskrat house surveys have been carried out in the area's marshes since 1978. The results of these counts are summarized in a series of reports by LaFrance (1979, 1980, 1981, 1983, 1984, 1986, 1987).

A summary of these data, excerpted from LaFrance (1987), is provided in Table 7. Counts from "Matchedash Bay" refer to the cattail marshes in the northwestern and northeastern portions of the project area, while those from "Gray's Marsh" pertain to the area extending from Bush's Point south and east to County Road 13 (which includes West Bay, North Bay and Catfish Bay). Total house counts range from a low of 432 in 1979 to a high of 1,094 in 1980, with an average of 673 houses/year (Table 7).

Fluctuations in the number of muskrat houses observed over the past decade in Matchedash Bay are believed to be closely linked to fluctuations in Georgian Bay water levels (LaFrance 1987). For example, a total of 836 houses was counted in 1987, an increase of 268 from the previous year. LaFrance (1987) attributes this increase to muskrats benefitting from elevated lake levels in 1987, as compared to the historical low recorded in 1986.

The importance of Matchedash Bay as productive habitat for muskrats is reflected in the harvest data available for the area. Since 1978, an average of 1039 muskrats/year have been taken from the bay by trappers licensed to work the area. Based on the cumulative data available, it is estimated that approximately 30% of all muskrats produced since 1978 have been harvested by trappers. LaFrance (1987:4) concludes that "trappers have been voluntarily regulating their trapping pressure to maintain a healthy and viable muskrat population on these marshes".

No rare species were trapped or observed in either the 1982 or 1989 surveys. However, several interesting occurrences have been reported by individuals who are familiar with the mammalian fauna of the area.

A dead Hairy-tailed Mole (*Parascalops breweri*) was found in a cow pasture in 1982 (McLachlin and Van Stam 1982). A species whose distribution in Canada is restricted

TABLE 7:

**MUSKRAT HOUSECOUNTS, MATCHEDASH BAY PROVINCIAL
WILDLIFE AREA, 1979-1987**

<u>Year</u>	<u>Matchedash Bay</u>	<u>Gray's Marsh</u>	<u>Total</u>
1979	351	81	432
1980	745	349	1,094
1981	477	244	721
1982*	-	-	-
1983	430	216	646
1984	332	244	576
1985	318	192	510
1986	225	343	568
1987	491	345	836
Mean	421	252	673

* No survey conducted
Source: LaFrance (1987).

to southern Ontario and southern Quebec, the Hairy-tailed Mole is considered by Van Zyll de Jong (1983:159) to be "generally uncommon, although concentrations occur in scattered localities where suitable habitat [second-growth woodlands, forest edges, and old fields] is available".

Anecdotal records of American Black Bear (*Ursus americanus*) were received by McLachlin and Van Stam (1982). Common and widely distributed north and east of Matchedash Bay, nowadays this species rarely wanders south of the Precambrian Shield.

According to a local trapper (R. Cronin, pers. comm., 1989) River Otters (*Lutra canadensis*) are more frequently encountered in the Matchedash Bay marshes in recent years. In Ontario, the River Otter is considered to be a "provincially significant" mammal (Ontario Ministry of Natural Resources and Environment Canada 1984)".

In the early summer of 1989 a family group of Moose (*Alces alces*), comprised of a bull, a cow and a calf, was observed swimming across Matchedash Bay between Bush's Point and "The Chimneys" (R. Cronin, pers. comm., 1989). A moose was also observed in the same area in the summer of 1988. Like the American Black Bear, this species typically inhabits the area to the north of the bay. Cronin (pers. comm., 1989) speculates that the family group moved south from the Port Severn/Severn Falls area.

Although he has never trapped a Fisher (*Martes pennanti*), Cronin (pers. comm., 1989) has occasionally observed the tracks of this large mustelid in the upland portions of the project area. A denizen of northern coniferous forests, the Fisher is generally believed to be extirpated from the area south of the Precambrian Shield (Banfield 1984). Recent records of this species in the Matchedash Bay area must be considered extremely rare occurrences.

Cronin (pers. comm., 1989) also reports that "wildcats" (Bobcat or Lynx [*Lynx* sp.]) are occasionally sighted by local residents of the bay. Matchedash Bay is situated within the zone of overlap between the Ontario ranges of these two cats (Banfield 1974).

7.2 REPTILES AND AMPHIBIANS

Owing to the fact that Matchedash Bay supports a diverse number of natural habitats and is situated on the southern fringe of the Precambrian Shield, the area is well represented by reptiles and amphibians. A total of 17 herptile species was recorded during the 1989 biological inventory (Appendix E). Given their known range and habitat requirements in Ontario, several additional species undoubtedly occur as well. All but one of the 12 herptile species recorded from the Gray's Marsh/Catfish Bay area by Van Stam and McLachlin (1982b) were encountered in the present study (Appendix E).

The vast majority of the reptile and amphibian species known to occur in the MBPWA are considered to be abundant or common and of widespread distribution within the geographic jurisdiction of Central Region of OMNR (Plourde *et al.* 1989, see Appendix E). These include American Toad (*Bufo americanus*), Spring Peeper (*Hyla crucifer*), Tetraploid Gray Treefrog (*H. versicolor*), Bullfrog (*Rana catesbiana*), Green Frog (*R. clamitans*), Northern Leopard Frog (*R. pipiens*), Wood Frog (*R. sylvatica*), Common Snapping Turtle (*Chelydra serpentina*), Painted Turtle (*Chrysemys picta*), and Common Garter Snake (*Thamnophis sirtalis*), all of which occur in suitable habitat throughout the study area.

Four significant herptiles were encountered in the MBPWA in 1989 (Table 6). Map Turtles (*Graptemys geographica*) were noted basking on small rocky islets in the northwestern portion of Matchedash Bay on several occasions (Figure 6). On May 17, a total of 17 Map Turtles comprising all age classes was observed together on one rock. The Map Turtle is a species whose preferred habitat is large bodies of water such as lakes and rivers (Cook 1984). Although it is fairly common along the shores of Georgian Bay to the north of the study area, the only suitable habitat for the species in the MBPWA is restricted to the small bedrock islands in the north end of the bay. The Map Turtle is considered to be "uncommon and local" in Central Region of OMNR (Plourde *et al.* 1989). This species was not recorded during the herpetofaunal survey of Gray's Marsh/Catfish Bay conducted in 1982 (Van Stam and McLachlin 1982b).

Blanding's Turtles (*Emydoidea blandingii*) were noted on three occasions in 1989, twice basking in flooded woodlands between One Eye Point and Concession Road 13. A road killed female was found along County Road 59, in the northeast corner of the study area on May 31 (Figure 6). The Blanding's Turtle has been accorded the regional status of "uncommon and widespread" (Plourde *et al.* 1982). This species was not recorded in the 1982 survey (Van Stam and McLachlin 1982b).

Five-lined Skinks (*Eumeces fasciatus*) were found in two locations during the 1989 inventory (Figure 6). This species was not previously recorded by Van Stam and McLachlin (1982b). On May 10, seven individuals were found on an open bedrock outcrop near the Tay Road 12 crossing of Thiffault Creek. A single female skink was discovered in similar habitat approximately 1 km south of One Eye Point. Given that in Ontario the Five-lined Skink is generally restricted to the southern edge of the Precambrian Shield (Weller and Oldham 1988), a feature which is only marginally represented in Central Region of OMNR, the species has been accorded the regional status of "rare and local" (Plourde *et al.* 1989).

In 1989, a single Milk Snake (*Lampropeltis triangulum*) was uncovered beneath a rotten log just east of One Eye Point (Figure 6). Single individuals were also recorded in the southern section of the marsh on three separate occasions in 1982 (Van Stam and McLachlin 1982b). Plourde *et al.* (1989) consider the Milk Snake to be regionally "uncommon and widespread", but acknowledge that the species is under recorded due to its secretive habits.

Pickerel Frog (*Rana palustris*) was the only herptile recorded by Van Stam and McLachlin (1982b) which was not encountered during the 1989 survey. A single Pickerel Frog was observed in sedge meadow habitat in Gray's Marsh on May 28, 1982. The status of this species in Central Region of OMNR is "uncommon and widespread" (Plourde *et al.* 1989).

Two unsubstantiated anecdotal reports of Massasauga (*Sistrurus catenatus*) were received from local residents of the study area during the 1989 survey. Both referred to historical occurrences. Since the Massasauga is a typical wetland species, and is found

just north of Matchedash Bay along the eastern shore of Georgian Bay, it is possible that this regionally "rare and local" snake (Plourde *et al.* 1989) still persists in low numbers in the study area.

Logier and Toner (1961) cite a specimen record for Fox Snake (*Elaphe vulpina*) from Waubauskene, just outside the project area. No date or other locality data are provided. Like the Massasauga, this snake is found to the north of Matchedash Bay, along the eastern shore of Georgian Bay. It has been accorded the status of "rare and local" in Central Region of OMNR (Plourde *et al.* 1989). Although suitable marsh and open rock habitat exists for this species at Matchedash, there is no evidence to suggest that it still occurs in the area.

One species of snake which is apparently absent from the herpetofauna of Matchedash Bay is the Northern Water Snake (*Nerodia sipedon*). It was not recorded in either 1982 or 1989. This is somewhat surprising given that the species is generally common throughout the waters of Georgian Bay and ideal habitat exists around the margins of Matchedash Bay.

7.3 BUTTERFLIES

A total of 41 species of butterflies was encountered in the MBPWA during the 1989 inventory (see Appendix F). Butterfly observations were mostly incidental and the present list is by no means complete. It does, however, give a good indication that a fairly diverse lepidopteran fauna is present in the study area. Butterflies are primarily organisms of sunny situations. In Matchedash, open areas such as roadsides, rock outcrops, old fields, wet meadows and woodland edges are the favoured habitats. Relatively few species were found to inhabit the extensive cattail marsh or closed canopy forest areas. No rare butterflies were encountered but at least three species, Silver-spotted Skipper (*Epargyreus clarus*), Black Swallowtail (*Papilio polyxenes*) and Baltimore (*Euphydryas phaeton*), are near the northern edge of their ranges in Ontario (Hess 1982).

8.0 FISHERIES RESOURCES

8.1 FISH COMMUNITY COMPOSITION

Existing records of the occurrence of fish species present in Matchedash Bay and the North and Coldwater Rivers were reviewed (Borecky and Edmunds 1978; Ecocern Limited 1987; Goodyear *et al.* 1982; Van Stam and McLachlin 1982c) and supplemented with 1989 field observations. A total of 39 species of fish is known to occur within the Matchedash Bay Provincial Wildlife Area (Appendix G). The locations of fish sampling areas referred to in Appendix G are shown on Figure 11.

Matchedash Bay supports a diverse, warmwater fishery, offering good spawning and/or rearing habitat for northern pike, largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), pumpkinseed (*Lepomis gibbosus*), carp (*Cyprinus carpio*), longnose gar (*Lepisosteus osseus*), bowfin (*Amia calva*) and yellow perch (*Perca flavescens*).

The most common species present in the bay are pumpkinseed, largemouth bass, yellow perch and black crappie, of which both adults and young-of-the-year occur (Borecky and Edmunds 1978; Van Stam and McLachlin 1982c). Seine netting produced young-of-the-year of all these species at virtually every location sampled and consequently, Matchedash Bay as a whole should be considered an important rearing area.

Van Stam and McLachlin (1982c) noted largemouth bass and pumpkinseed nests in North, West and Catfish Bays. Nesting activity was noted on the south shore of the bay in 1989, largely by pumpkinseeds. Large depressions which appeared to be bass nests were also observed, but along the south and north shores of Matchedash bass spawning was finished prior to May 31. Water temperatures in Matchedash Bay were much higher (19.5°C to 26°C) than those of Georgian Bay (15°C) in late May, 1989. Carp were abundant throughout the bay and very active. It is possible that some of the depressions observed in the mats of submergent aquatic vegetation are the result of their feeding.

Observations of nesting activity in 1989 were hampered by poor water clarity over the lower half of the bay. A line delimiting the approximate extent of turbidity in the bay in

1989 is shown on Figure 11. While intensive carp activity may influence turbidity locally, through the stirring up of fine-particled sediments, the North and Coldwater Rivers are the primary contributors of suspended material to the Bay.

Young northern pike were rarely encountered in the bay despite the presence of suitable spawning areas and reported spawning activity. Great Lakes water level fluctuations will influence pike spawning success in a given year and it is possible that poor spawning conditions preceeded the years in which fish surveys were undertaken. Furthermore, by the time the surveys were undertaken in the summer months, the bay would be very warm, exceeding the optimum pike spawning temperature of between 19 and 23°C (Casselman 1978). Consequently, both adults and young pike may have already dispersed into the deeper portions of Matchedash Bay (which were not sampled) or to the cooler waters of Georgian Bay.

Matchedash Bay links Georgian Bay with the North and Coldwater Rivers. Seasonally, the bay and its inflowing rivers serve as important migratory corridors for walleye (*Stizostedion vitreum vitreum*) and salmonids.

Walleye move through Matchedash Bay in the spring to spawn in the North River, upstream of the MBPWA. The young walleye will drift downstream, ultimately dispersing into Matchedash Bay and Severn Sound. The walleye is considered a coolwater fish species. By the time the summer surveys were undertaken, water temperatures in Matchedash Bay may have exceeded the walleye's preferred range of 20.6 to 23.2°C (Hokanson 1977), thus forcing them into the deeper areas of the bay or the open waters of Georgian Bay. While young-of-the-year walleye were captured in the 1987 electrofishing survey of the North and Coldwater Rivers (Ecocern Limited 1987), they were few in number compared to the numbers of other species collected, were not captured in other surveys in the bay and, unfortunately, the 1987 electrofishing survey did not extend into the main portion of the bay. The North and Coldwater Rivers likely also provide a cooler refuge for walleye, which may account for their presence there. No adults were collected.

A variety of salmonids migrate from Georgian Bay into the Coldwater River to spawn upstream of the project area. These species include brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), and chinook (*O. tshawytscha*) and coho (*O. kisutch*) salmon. Brook trout (*Salvelinus fontinalis*) are also present in both the North and Coldwater Rivers but are residents in the cold headwater regions of these watercourses, well upstream of the MBPWA. Young salmon and trout generally spend one year in their natal stream prior to migrating downstream to open waters. While the young will pass through Matchedash Bay, the area does not provide suitable habitat for long-term growth.

Only 15 forage fish species have been recorded from the MBPWA, compared with 24 species of sport or game fish, of which at least half are primarily piscivorous. The young of many of these sport or game fish species may also be used as forage, a factor which may have a major negative influence on production. Young carp have not been noted despite the large numbers of adults present. The young may be readily consumed by a variety of predators. Similarly, though, northern pike are reported to be an important predator on young walleye (Scott and Crossman 1973).

None of the 39 fish species known to occur in the MBPWA is rare. Spotted gar (*Lepisosteus oculatus*), a species which is considered rare in Ontario and Canada (COSEWIC 1989; McAllister *et al.* 1985; OMNR 1988) was reported by Van Stam and McLachlin (1982c) for Matchedash Bay. Given that no specimens apparently exist and that the known range of the spotted gar in Ontario is restricted to the Lake Erie and Lake St. Clair drainage basins (Parker and McKee 1984), this record is probably erroneous. The longnose gar is commonly known from this area and is the only species of *Lepisosteus* which has been noted in subsequent fish surveys (Ecocern Limited 1987; LaFrance, pers. comm. 1989).

8.2 AQUATIC HABITATS

Coastal marshes provide essential spawning and rearing areas for many Great Lakes fishes. The existence of a large cattail marsh in Matchedash Bay is a unique feature along the Severn Sound-Georgian Bay shoreline. The marsh and its tributary rivers provide spawning and/or rearing habitats for many species known from Severn Sound

(OMOE 1988) including walleye, northern pike, salmon and trouts, black crappie, yellow perch, and largemouth bass.

Three primary aquatic habitat types were identified within the study area:

- 1) riverine
- 2) littoral marsh
- 3) open bay

Each habitat type is suited to different fish species or stages in the life cycle of a single species. Habitat types are shown on Figure 11.

8.2.1 Riverine

Both the North and Coldwater Rivers within the study area are characterized by deep, U-shaped channels with low gradients. The rivers are classified as warm water and possess fairly poor water quality. Suspended sediment concentrations and nutrient loads are particularly high in these two watercourses.

Sediment loads are carried into Matchedash Bay via the rivers. During periods of low flow, the resultant turbidity is largely confined to the main navigation channel running through the bay. However, poor water clarity is prevalent throughout the eastern portion of the bay during most fish spawning periods. A line demarcating the approximate influence of turbidity is shown on Figure 11. This line coincides with the transition of the North River channel into open water. While a channel area is still maintained, open water conditions dominate.

There is a limited amount of instream cover present in both rivers. Turbidity precludes major plant growth, although the suspended sediments may also substitute as cover for fish. Some fallen trees and other wood debris form the bulk of the available instream cover.

Riparian vegetation is largely limited to dense stands of cattails with minor amounts of other emergent species (see Figures 5 and 11) along most of the lengths of both rivers.

These rivers serve primarily as migratory routes for walleye and several salmonid species.

Thiffault Creek could also be considered as riverine habitat but is not comparable to either the North or the Coldwater River. The mouth of Thiffault Creek is obstructed by dense emergent and submergent vegetation and flows are minimal throughout the year. Water clarity is good and the channel supports abundant vegetative cover. Pike may be attracted to Thiffault Creek for spawning when higher spring flows project a current along the north shore of the bay.

8.2.2 Littoral Marsh

It may be argued that the entire expanse of Matchedash Bay should be considered the littoral zone, as plant growth likely covers the entire bottom. However, it is the littoral zone as shown on Figure 11 which functions as the primary spawning and rearing area for fish.

The littoral marsh can be divided generally into two types:

- 1) shallow water, and
- 2) deep water.

Within both types, areas of submergent and mixed-emergent, submergent and floating plant communities have been delineated on Figure 11. These areas generally correspond to the vegetation cover type mapping (Figure 5).

Shallow Water

In 1989, shallow marsh areas generally had water depths less than 0.6 m. These areas included Catfish Bay, North Bay, West Bay and some areas along the south shore of Matchedash Bay. These locations also experienced localized water level changes in response to wind direction, which causes seiches in Georgian Bay. At times during the 1989 survey turbid conditions were also noted in these smaller protected bays, due to the influence of the North and Coldwater Rivers.

Although the composition of aquatic plant communities are quite similar throughout the bay, variable water depths may preclude their effective use by some fish species and size ranges. Similarly, the plants may not grow to their full potential offering the best cover. Bobbette (1983b) noted that waterlilies were most abundant in water depths of 1.0 m or greater. He also found that the transition between aquatic and wetland plant species began at water depths between 0.4 and 0.8 m.

The shorelines of these shallow water habitats are lined with dense stands of cattails (*Typha* sp.). Pike spawn along flooded shorelines, their eggs adhering to mats of vegetation underwater. Although pike are known to use a variety of vegetation types for spawning, including *Typha*, their preference would appear to be for submergents or 'soft' emergents such as Reed Canary Grass, sedges (*Carex* spp.), water plantain (*Alisma* sp.), water-milfoil (*Myriophyllum* sp.), waterweed (*Elodea* sp.) and pondweeds (*Potamogeton* spp., *Najas* sp.), that form a mat below the water surface in spring (McCarraher and Thomas 1972). It is unlikely that these areas are as productive for pike or centrarchids as they could be. Catfish Bay presently offers the poorest diversity of habitat, while the North and West Bays appear to be of similar value. Van Stam and McLachlin (1982c) suggest that West Bay is somewhat more productive and therefore a better habitat for fish.

Deep Water

Deepwater marsh areas are largely restricted to the northwest portion of Matchedash Bay. A much smaller area of deeper water habitat is also present on the south shore. Nearshore water depths were greater than 0.6 m in 1989, and were maintained at or near this level throughout the field season. Water clarity was good and a variety of emergent, submergent and floating vegetation types were present, including, Wild Rice, waterlilies, Eelgrass, water plantain, and pondweeds.

Two substrate types dominated the deepwater areas: bedrock outcrops grading to sand, gravel or rubble offshore, and organics. Sandy substrates are found mainly to the east of One Eye Point and organics dominate the more sheltered areas to the west of the point. The coarse, rock, sand and gravel substrates provide a different habitat type

which is not well represented elsewhere in the bay and one that may attract spawning smallmouth bass (*Micropterus dolomieu*) and rock bass (*Ambloplites rupestris*).

While much of the shoreline in the northwest corner of the bay is lined with cattails, a large portion of the area is bordered by mixed emergents, which may provide good pike spawning habitat.

The northwest and northeast sections of the bay represent the highest quality fish habitat found throughout the MBPWA. A variety of species, especially largemouth bass and northern pike, will use this area for spawning, rearing and feeding given the existing water depths, substrates and vegetation. Equally important however, is the continuum of habitats, or the direct connection this area has to the open waters of Matchedash Bay and eventually to Severn Sound and Georgian Bay.

Open Water

A small area of the bay can be considered open water, characterized by relatively greater depths and a more lake-like character. While the navigation 'channel' is still present in the central portion of the bay, it is not nearly so well defined as in the eastern portion of the bay. In 1989 the open water area was not observed to be influenced by the turbidity of the North and Coldwater Rivers.

Although submerged vegetation is also present in this habitat, it is not functionally as important as the water depths. This area provides a refuge for larger fish and those seeking slightly cooler waters (e.g., walleye, pike). On one survey date in 1989 water temperatures in the North River were 19°C, compared with 26°C in the shallow back bays.

The majority of fishing activity observed in 1989 took place in the open water zone or in the North and Coldwater Rivers.

9.0 SURFACE WATER

9.1 INTRODUCTION

Matchedash Bay is a shallow basin which responds quickly to ambient air temperatures (i.e., its water warms up rapidly). Due to its uniformly shallow water depths the bay does not undergo seasonal stratification. As such, the water column is continually mixing.

The Matchedash Bay watershed is primarily drained by the Coldwater and North Rivers, which enter the south end of the bay. One of the predominant land uses within the watershed is agricultural; active farmland areas are associated with both river valleys. Matchedash Bay provides approximately 7.8 km² of storage capacity.

9.2 WATER QUALITY

Both the Coldwater and North Rivers are sources of phosphorus loading to Matchedash Bay. Water quality data obtained from five locations in Matchedash Bay in 1989 (Figure 12) reveal that phosphorus loadings to the bay are highest in the early spring (i.e., March) (Figure 13). There is a positive correlation between high phosphorus loadings and high flow volumes in both rivers associated with the peak spring runoff event (see Appendix H). Phosphorus inputs from the North River in March, 1989 were four times as high as those from the Coldwater River (Figure 13). Although the Coldwater Sewage Treatment Plant is situated just upstream of the southern boundary of the MBPWA, and discharges treated effluent to the Coldwater River on a continual basis, the peak phosphorus load from this facility was 2.5 Kg/day in March, 1986 (OMOE 1987). This is an extremely low value when compared to the total daily loadings from both rivers measured in March, 1989 (Figure 13), and provides strong evidence that agricultural land associated with the two river basins is the primary source of phosphorus entering Matchedash Bay.

To date, the OMOE has not sampled water quality conditions in the bay itself, only in the Coldwater and North Rivers (Appendix I). (Figure 12). Data obtained from the open water portions of Matchedash Bay in 1989 show that total phosphorus concentrations in mid-August and particularly in mid-September of 1989 were well

FIGURE 12

HYDROLOGICAL SAMPLING STATIONS Matchedash Bay

Provincial Wildlife Area

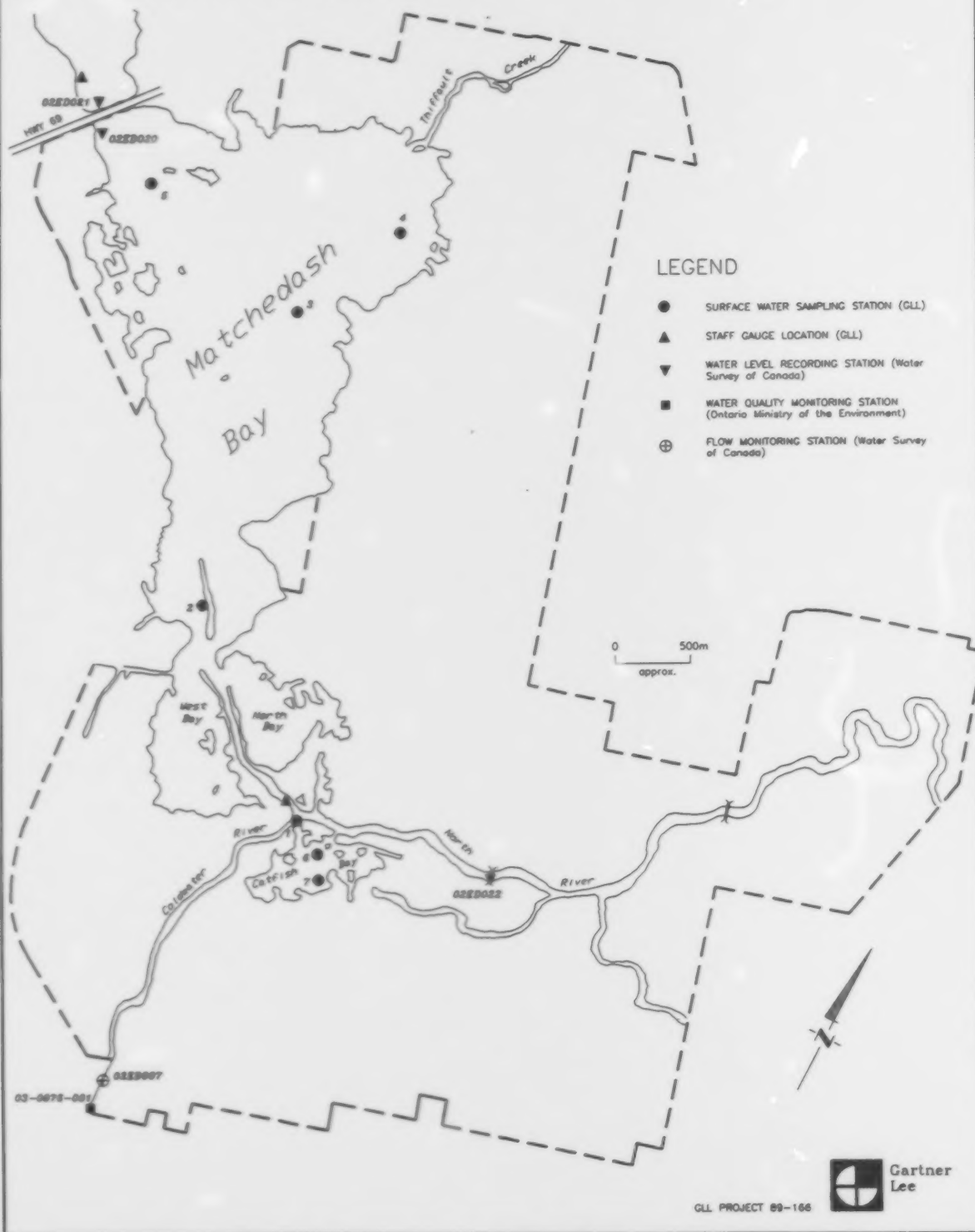
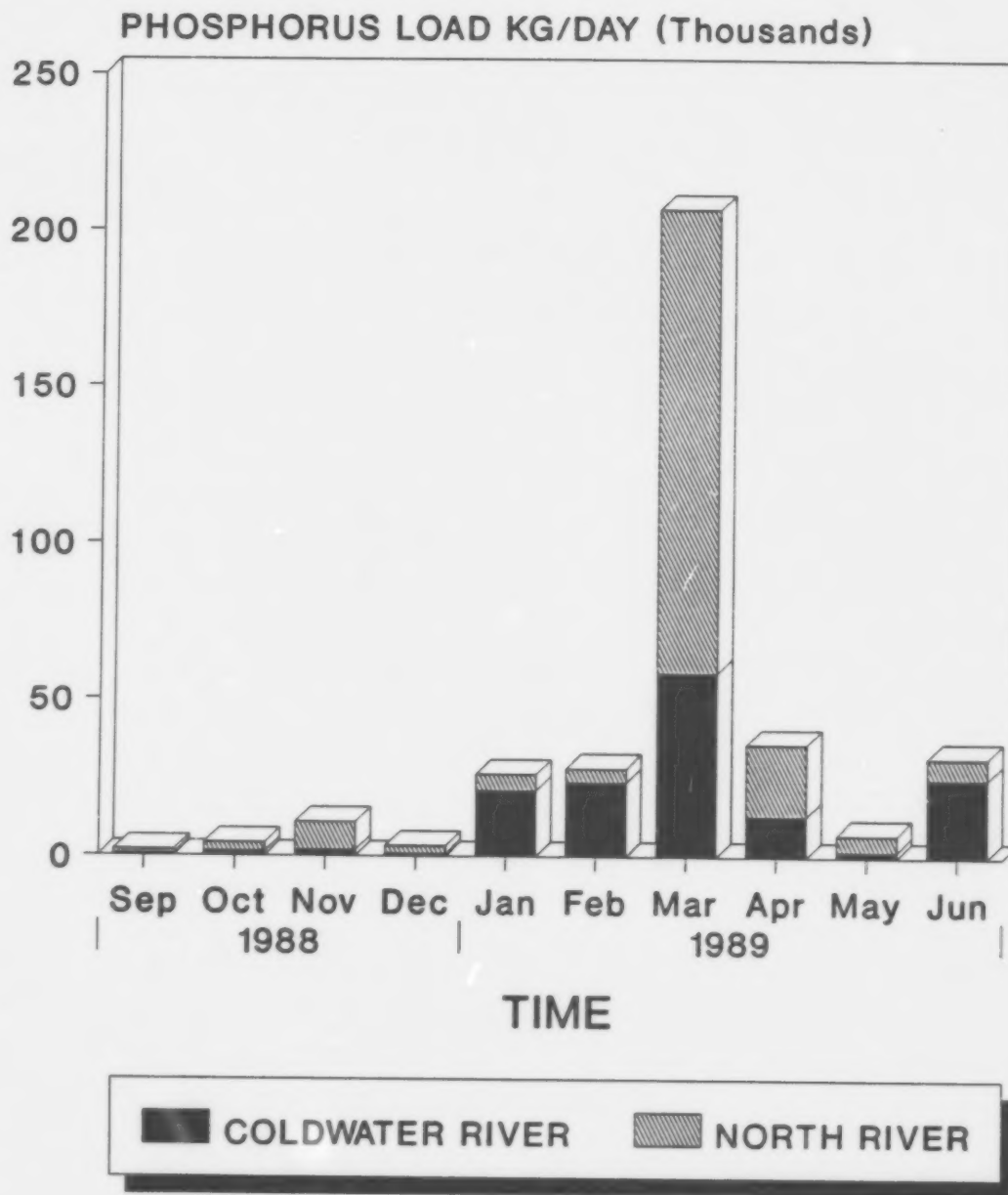


FIGURE 13
TOTAL PHOSPHORUS LOAD TO MATCHEDASH
FROM COLDWATER AND NORTH RIVERS KG/DAY



above the Provincial Water Quality Objective (PWQO) (OMOE 1984) of 0.02 mg/l for standing bodies of water (Figure 14).

The shallow nature of the bay results in a euphotic zone (the depth at which photosynthesis can occur) which extends through the entire depth of the water column. The potential for the production of phytoplankton in the form of algae is therefore high throughout the bay. Phytoplankton production is measured through chlorophyll *a* concentrations and Secchi disc readings. Measurements of these parameters in Matchedash Bay in 1989 indicate an inverse relationship between high chlorophyll *a* concentrations (Figure 15) and low water clarity (Figure 16) in the early summer. Phytoplankton growth peaked in June, before levelling off throughout the rest of the summer. This levelling off is likely associated with the peak of the macrophyte (e.g., cattails) growing season. Both phytoplankton and macrophytes compete for phosphorus and by mid-summer an equilibrium in phosphorus uptake between these two plant forms is usually reached.

In late summer/early fall the macrophytic vegetation undergoes fall senescence, releasing phosphorus back into the water column. In Matchedash Bay, this phenomenon accounts for the high phosphorus concentrations present in mid-September (Figure 14). During the late fall Matchedash Bay undergoes gradual oxygen depletion, resulting in anaerobic conditions during the winter (OMOE 1988). This oxygen depletion is likely caused by the decomposition of aquatic vegetation, a process which uses up much of the available oxygen. Under anaerobic winter conditions phosphorus held within the lake bed sediment is released back to the water and is thus available for phytoplankton growth during the following spring.

10.0 SIGNIFICANT FEATURES

10.1 AREA OF NATURAL AND SCIENTIFIC INTEREST (ANSI)

A 610 ha portion of the Matchedash Bay study area which incorporates Gray's Marsh is recognized as a Provincially Significant Life Science ANSI (Hanna 1984). The Life Science Inventory Check-sheet prepared for this ANSI is included as Appendix J.

FIGURE 14
TOTAL PHOSPHORUS CONCENTRATIONS
MATCHEDASH BAY, 1989

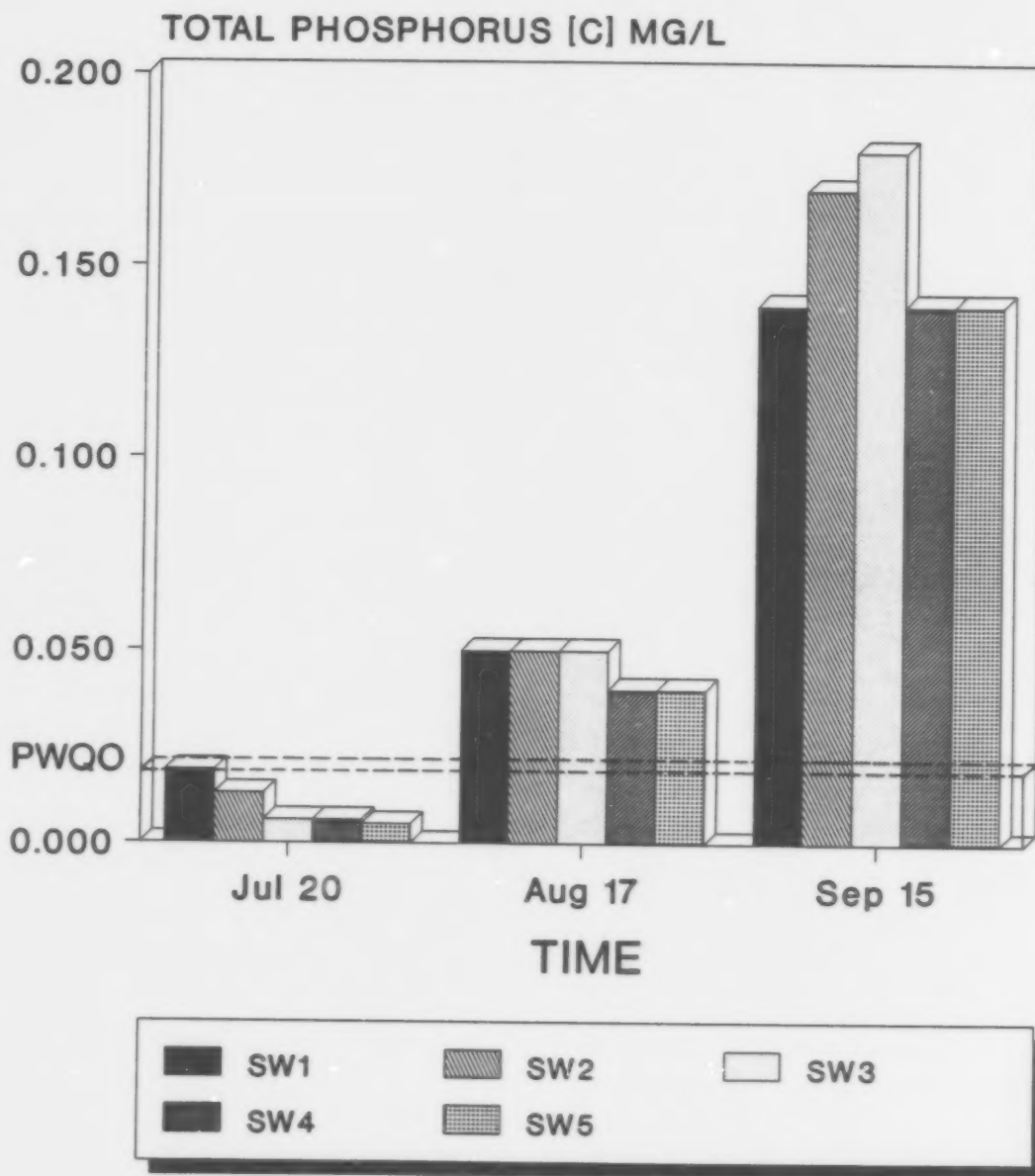


FIGURE 15
CHLOROPHYLL a CONCENTRATIONS
MATCHEDASH BAY, 1989

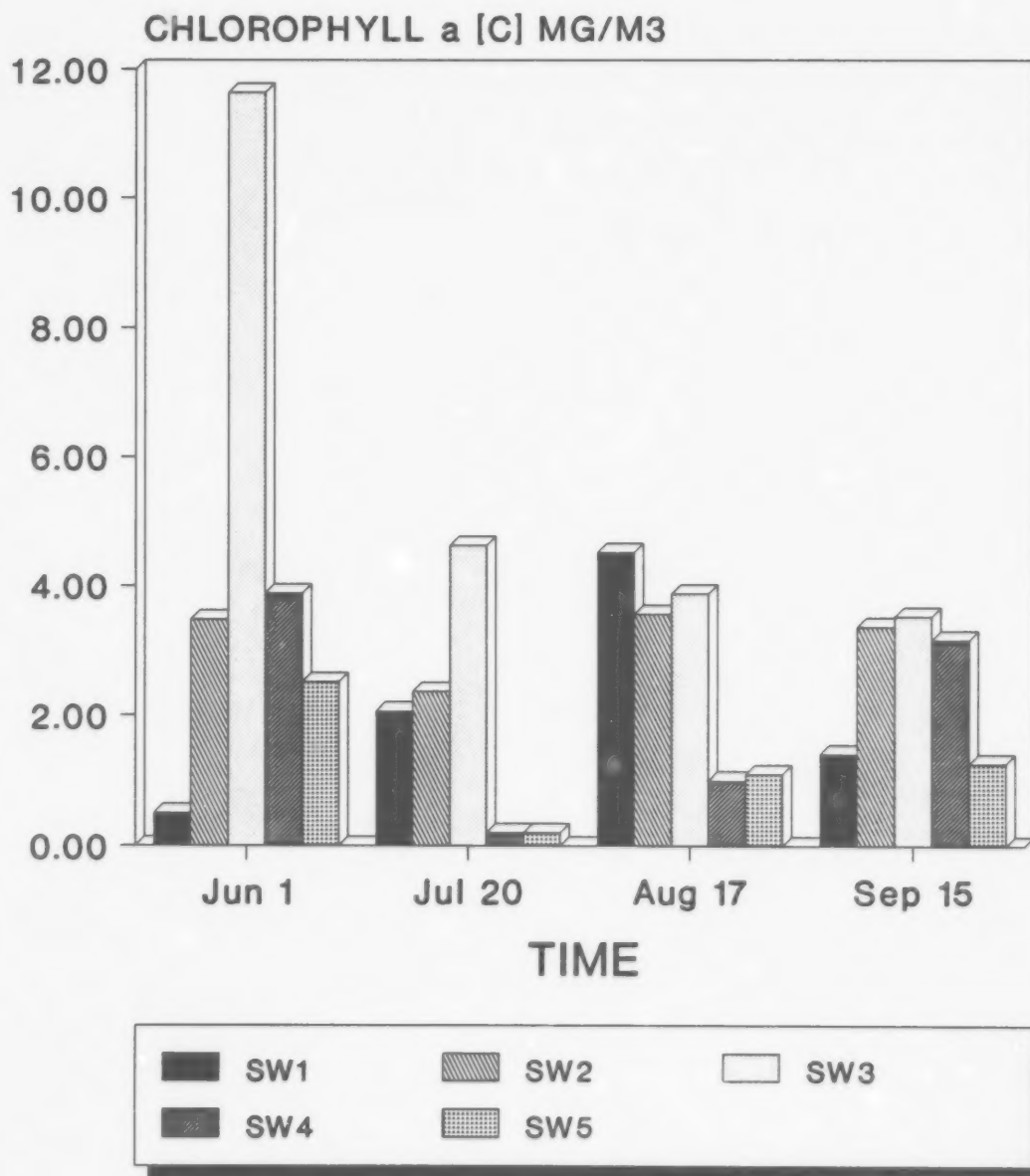
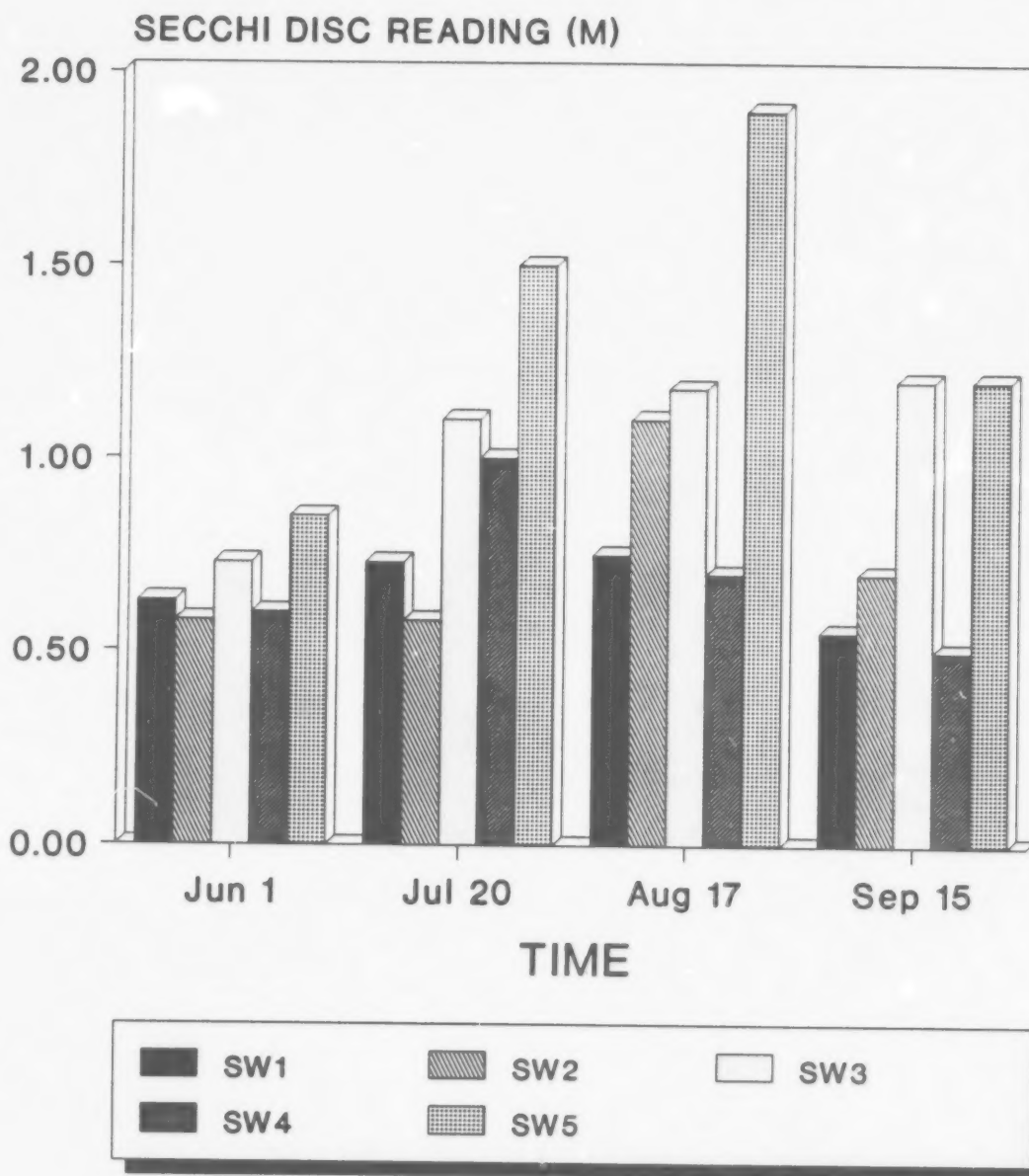


FIGURE 16
SECCHI DISC READING (M)
MATCHEDASH BAY, 1989



Hanna (1984:47) describes Matchedash Bay "as one of the largest cattail-sedge marshes in Site District 6-6 [which] contains a variety of marshland, lowland and upland vegetation types, uncommon southern plants and acts as a migratory waterfowl stop-over area". On the basis of this evaluation Matchedash Bay was selected to represent organic wetland features within the Simcoe Lowlands Physiographic Region.

The boundaries of the Matchedash Bay ANSI were subsequently refined by Central Region OMNR (unpublished file map) and appear on Figure 17. The area occupied by the ANSI was calculated at 610 ha following the boundary revisions. Following the analysis of data for the present study, four areas comprising 180 ha of the ANSI are mapped (Figure 17) as being of somewhat lesser significance because they are either anthropogenic vegetation types (cultivated fields) or are disturbed native communities (cattail and/or sedge on the edge of the marsh areas with evidence of past agricultural activity). These areas should continue to be considered as part of the ANSI, but should be considered to be areas in which wildlife management activities (e.g., dyking) may be carried out, if net benefits to the entire study area are demonstrated.

The wetland area at the mouth of Thiffault Creek was evaluated in the context of Life Science ANSI values by Macdonald (1986). This 120 ha area, referred to as "One Eye Point Marsh", was assigned the status of a locally significant ANSI in Site District 5-7, the site district which contains the north side of Matchedash Bay. This status was based on the conclusion that the landform and vegetation features of One Eye Point Marsh are representative of Simcoe Lowlands marsh habitat in Site District 6-6, that the area contains a "restricted diversity of marsh/thicket communities", and that "no significant flora [have been] recorded", resulting in an overall assessment of "low significance" (Macdonald 1986:111).

The results of the 1989 biological inventory reveal that the One Eye Point Marsh is of considerably greater significance than originally believed, especially when considered in conjunction with Gray's Marsh to the south (in Site District 6-6). The area supports a high diversity of open upland, open wetland, aquatic, and dwarf scrub-barren communities (Figure 5) and contains one significant plant and three significant breeding bird species (Figure 6). In addition, the mouth of Thiffault Creek provides

some of the best fish (Figure 11) and waterfowl production (Figures 7 and 8) habitat in the MBPWA.

On the basis of these significant features, it is proposed that the open wetland and aquatic portions of One Eye Point Marsh be accorded the status of a Provincially Significant Life Science ANSI and amalgamated with the existing Matchedash Bay ANSI (see Figure 17, Section 11.2).

10.2 PROVINCIALY SIGNIFICANT (CLASS I) WETLAND

An 817.4 ha area encompassing virtually all of the open water marsh, coniferous swamp and sedge fen habitat contained within the MBPWA (see map in Appendix K) has been designated by the OMNR as a provincially significant (Class 1) wetland (Ferguson *et al.* 1986). Following the wetland evaluation system devised for southern Ontario by the Ontario Ministry of Natural Resources and Environment Canada (1984), Matchedash Bay received a total score of 711 out of a possible 1000 points. High point values were attained for the Biological, Social, and Special Features components of the evaluation, while the Hydrological significance of the wetland was determined to be relatively low (Ferguson *et al.* 1986; Appendix K).

The high degree of significance attached to the Matchedash Bay wetland within a provincial context has been recognized in a number of recent publications (e.g., Van Patter and Hilts 1985; Smith 1987; Glooschenko *et al.* 1988).

10.3 OPEN MARSH

The Matchedash Bay marshes are the largest and most diverse marshes on Georgian Bay. Two areas of high diversity open marsh habitat are identified on Figure 17. The central portion of Gray's Marsh occurs within the existing boundary of the Provincially Significant ANSI, while the One Eye Point (Thiffault Creek) Marsh is presently designated as a Locally Significant ANSI.

The marsh habitats of Matchedash Bay are significant for their representativeness within the Simcoe Lowlands Physiographic Region, their extensiveness, the variety of open wetland and aquatic vegetation cover types present, and the presence of a high

diversity of wetland flora and fauna. Most prominent among these marsh habitats are the large areas of dense sedges and cattails. These relatively homogeneous areas support a rather limited number of floral and faunal species compared to the diverse vegetation mosaic formed at the marsh/open water interface.

The significant marsh areas identified in Figure 17 contain a heterogeneous mix of submergent, floating and emergent aquatic weed beds and cattail and sedge areas interspersed with patches of shallow open water. Collectively these two marsh areas contain four regionally rare plant species and provide good feeding and nesting habitat for dabbling ducks and three provincially significant non-anserine waterbirds.

Although smaller in area, the One Eye Point (Thiffault Creek) Marsh is more diverse botanically than Gray's Marsh. The water clarity in the northeast corner of the bay is better than elsewhere in Matchedash Bay (Figure 16), a condition which may account for the presence of some plant and animal species. For example, Wild Rice is abundant at the mouth of Thiffault Creek while scarce elsewhere in the MBPWA. Several waterbirds, including Pied-billed Grebe, Wood Duck, American and Black Ten were also found here in the greatest numbers (Figure 6).

Gray's Marsh also contains vegetation cover types which are not represented elsewhere in the MBPWA. The large sedge dominated marshes on both sides of the Coldwater River provide important nesting habitat for Sedge Wrens. North Bay is the area used most intensively by feeding waterbirds, especially herons, dabbling ducks, shorebirds and Caspian Terns. Presumably the shallow waters of North Bay harbour abundant populations of forage fish and aquatic invertebrates on which the birds feed. West Bay and Catfish Bay are also important feeding areas for waterbirds but are not utilized to the same degree as North Bay.

10.4 SEDGE FEN

The small (2 ha) sedge fen area situated in the southwest corner of the MBPWA (Figure 17) is significant in several respects. It is the rarest wetland cover type which is represented in the MBPWA, being confined to a single stand. From a botanical

perspective, the fen is significant by virtue of its high species diversity contained within a small area and the uniqueness of the vegetation community composition.

At least 50 species of vascular plants occur in this community, many of which are not found in any other cover type within the MBPWA. In contrast to the fen, other wetland habitats are floristically depauperate. For example, species richness within the much more extensive stands of dense reeds or cattails may be as low as 10 to 15 species.

Two rare species of spike-rush, *Eleocharis rostellata* and *E. pauciflora*, grow in the fen. Neither occurs elsewhere in the MBPWA (Figure 6). Of the 21 significant plant species known to occur in the study area, *E. pauciflora* is the only one considered to be provincially rare. The sedge fen is entirely contained within both the existing and proposed boundaries of Matchedash Bay ANSI (Figure 17).

10.5 CEDAR-TAMARACK SWAMP

This saturated peatland, predominantly a coniferous swamp forest community, is also found in the southwest corner of the MBPWA and provides an important vegetated buffer surrounding the sedge fen (Figure 17). Like the fen, the cedar-tamarack forest is the only example of this cover type represented in the study area. The composition of the vegetation of this forest stand is unique in that it contains a high number of species with typically northern or boreal affinities, many of which are not found elsewhere in the MBPWA. Several elements of the breeding bird community which inhabits this area (e.g., the regionally rare Olive-sided Flycatcher and Golden-crowned Kinglet) are also characteristic of northern coniferous swamp forests. One regionally rare plant species, Stout Wood Grass, is associated with this cedar-tamarack stand (Figure 6).

This significant area is wholly contained within both the existing and proposed ANSI boundaries (Figure 17).

10.6 LOWLAND FOREST

Several small lowland forest stands in the southern half of the MBPWA are of particular significance, both locally and regionally. Within the larger mosaic of forest cover types surrounding the Matchedash Bay marshes, these significant lowland forests

generally appear as small wooded "islands" on raised bedrock knolls (Figure 17). Ned's Island and a larger woodlot due east of the junction of Kinnear Sideroad and County Road 17 are two of the best examples of this forest cover type represented in the MBPWA.

The significance of the lowland forest stands identified on Figure 17 is principally related to the presence of a number of typically southern plant species which are at or near the northern limit of their range in Ontario (see Section 5.1). Five regionally rare plant species are associated with these lowland forest stands.

Despite their significant attributes, most of these lowland forest areas have been degraded to some extent by selective tree cutting, livestock grazing and human disturbance (e.g., pedestrian trails, litter).

10.7 ROCK BARRENS

While granitic rock outcrops and their associated dwarf scrub-barren vegetation cover types are common to the north and east of Matchedash Bay, the existence of the actual shield-limestone plain contact zone within the study area results in the presence of several plant species which essentially do not occur further north. The three regionally rare species found in association with rock barrens in the northeast corner of the MBPWA (Figure 6), Carolina Cranesbill, Venus' Looking Glass and Bristly Raspberry, are examples of such species. Open rocky barren areas are subject to a microclimate which is warmer and drier than other areas. The general absence of soil and full exposure to sunlight create a unique set of habitat conditions that more specialized plants thrive in.

The warmer microclimate is also an important factor which influences the local distribution of the regionally rare Five-lined Skink and the regionally uncommon Milk Snake (Figure 6). Bare rocky islands and shorelines are favoured sunning sites for the regionally significant Map Turtle (Figure 6).

Some of the rock barrens have been heavily disturbed by past grazing activities, particularly those areas south of Twin Oak Point and west of Thiffault's Creek.

Outcrops along the east shore of the bay north of Twin Oaks Point generally represent areas of better quality habitat, although some have been impacted by cottage development.

10.8 "THE CHIMNEYS"

"The Chimneys" is the former site of Cowan's Trading Post, which operated in the late 1700s and early 1800s. It is situated at the mouth of the North River, opposite Bush's Point (Figure 17). Hunter (1989) has identified "The Chimneys" as the most significant 18th century archaeological site known to exist in Central Ontario. A more detailed account of the history and heritage resource value of "The Chimneys" is contained in Section 4.2.

11.0 MANAGEMENT CONSIDERATIONS

A management plan for the MBPWA (Mills-Plan Consulting Limited 1989) has been prepared in conjunction with this biological inventory study. The management plan should be consulted for information relating to the overall philosophy and approach to integrated resource management which the OMNR will apply to Matchedash Bay. A detailed set of management recommendations is outlined in this plan and addresses the following:

- waterfowl management;
- Areas of Natural and Scientific Interest;
- fisheries management;
- water quality;
- forest management;
- trapping of furbearers;
- historical/archaeological values;
- recreational activities (e.g., boating, angling, hunting);
- facility development (e.g., access, services); and

- other considerations (e.g., land acquisition, tourism, economic development, education, agriculture, drainage, navigation, public participation, Environmental Assessment requirements, and plan implementation).

The management considerations discussed in this section of the report are those which deal specifically with the significant biological, hydrological and heritage features and areas which have been identified in the MBPWA. Particular attention is given to those measures which will contribute to the long-term protection of the provincially significant Life Science ANSI and other areas of significance shown on Figure 17.

11.1 HERITAGE RESOURCE MANAGEMENT

As stated in the MBPWA management plan, archaeologically and historically significant features of the project area shall be preserved and protected from disturbance.

To this end, it is the recommendation of Hunter (1989) that, in order to satisfy the requirements of the Environmental Assessment Act, the OMNR commission two studies: (1) an archaeological assessment of "The Chimneys" historic site and 2) an archaeological survey of selected areas within the project area which could be affected by the proposed waterfowl management projects.

Very little is presently known about "The Chimneys" site. The survey approach proposed by Hunter (1989) involves recording above ground remains and carrying out shovel testing across the entire site. This will necessitate the removal of some vegetation, particularly the long grasses and dense hawthorns which obscure the ground surface.

Although the actual location of the old "chimneys" is reasonably well known, the associated features of the site (e.g., the wharves, houses, wells, storehouses, privies, stockades, outlying farm buildings and associated middens/garbage pits) are not. It is anticipated that a surface investigation would reveal the specific locations of these features. However, no archaeological excavation of the site is proposed.

The survey should be carried out in early spring when the vegetation is reduced, allowing better visibility of the ground surface. Hunter (1989) has estimated that this preliminary assessment will take approximately 21 days to complete, at a cost of between \$3000 and \$5000.

Investigations of other potential archaeological sites within the MBPWA would primarily involve a shoreline and river survey with some limited surveying and testing being carried out in areas where topographical and natural features (e.g., islands, points of land, relict beach ridges, etc.) suggest a high probability of past human occupation. The specific scope and terms of reference for a study of this kind would have to be dictated by the Environmental Assessment requirements of the Ontario Ministry of Culture and Communications. However, it is anticipated that any archaeological investigations extraneous to "the Chimneys" site would be carried out only in these areas where excavations for cell creation, and the construction of dykes and other water level control structures is proposed. The estimated time frame and costs for this larger survey are 50 to 60 days and \$15,000 to \$20,000, respectively (Hunter 1989).

Although technically outside the project area, two Indian archaeological sites (BeGW-13 and BeGW-16) on the west shore of Matchedash Bay (Figure 4) could be affected by management activities related to the management plan. The continued protection of these significant sites should be an important consideration in assessing the effects of future development in Matchedash Bay.

11.2 ANSI MANAGEMENT

On the basis of the findings of the biological inventory and the recommendations provided in the management plan it is proposed that the present boundaries of the Matchedash Bay ANSI be revised to better reflect the most representative, unique and significant wetland features which are present within the MBPWA. Both existing and possible future ANSI boundaries are shown in Figure 17.

The possible boundary alterations would involve the addition of a small area incorporating "The Chimneys" site and the deletion of four larger blocks of disturbed

marsh around the perimeter of the present ANSI (Figure 17). The four areas to be dropped are presently dominated by dense, homogeneous stands of cattail and/or sedge with little or no interspersed open water. Interpretation of historical air photos of the area indicates that some of these areas have been converted to an agricultural land use (e.g., hay fields) under low water level conditions. The MBPWA management plan calls for the construction of dyked marshes in these areas to create additional habitat for migratory and breeding waterfowl. Removal of these four wetland blocks will result in a reduction in the total area of the present ANSI from approximately 610 ha to 400 ha.

Following implementation of these boundary changes, the representative, unique, and significant resource values of the present ANSI, as described in Section 10.1, would be retained.

It is also recommended that 120 ha of the One Eye Point (Thiffault Creek) Marsh be designated as a Provincially Significant Life Science ANSI and incorporated with the remaining 390 ha in the southern portion. Results of the 1989 field inventory suggest that the ANSI values exhibited by this area are more significant than was believed at the time of the original evaluation (Macdonald 1986). The inclusion of One Eye Point (Thiffault Creek) Marsh, with its regionally rare plant species, a Black Tern colony, and important waterfowl nesting and fish spawning/nursery habitat, will further enhance the overall significance of the Matchedash Bay ANSI.

No changes, however, should be made to the existing ANSI boundary (with the exception of the addition of One Eye Point Marsh) until such time as the management plan is completed and wildlife management measures (e.g., dykes) are actually implemented. This approach would ensure that an appropriate interim status for the existing ANSI is maintained until final land management decisions are made.

In accordance with provincial guidelines (OMNR 1987) the Matchedash Bay ANSI will be preserved in its natural state and its present ecological, physical, and hydrological processes will be allowed to continue without undue interference from man. In order to achieve the necessary measure of protection from incompatible resource management

activities which will be carried out elsewhere in the MBPWA, the ANSI will be contained within a "Natural Zone", as described in the management plan. This designation precludes any development or active waterfowl management such as dyked marsh creation, water level manipulations, and mechanical vegetation control.

Since the ANSI possesses some of the most productive fish, waterfowl, and waterbird habitat which presently exists in the MBPWA, these wetland areas will be allowed to function naturally in response to fluctuating lake levels and the processes of vegetation succession.

Traditional recreational activities such as waterfowl hunting, fishing, trapping, nature study and boating should be permitted to continue within the Matchedash Bay ANSI. The one exception to this is that hunting would not be permitted in a "no hunting zone" which may be established in an open water section of the ANSI situated between Bush's Point and Twin Oaks Point. The purpose of this "no hunting zone" would be twofold: 1) to protect an area which is commonly used by rafting diving ducks and 2) to reduce potential conflicts between hunters and residents of the Twin Oaks subdivision.

No active forest management (e.g., tree cutting, planting) should be allowed to occur within the ANSI. Due to the shallow nature of the bay, motor boat traffic will generally be confined to the deeper waters of the ANSI (i.e., the navigation channel and the North and Coldwater Rivers).

11.3 RARE SPECIES MANAGEMENT

The populations of the rare plant and animal species known to occur in the MBPWA should be periodically monitored. Outside the ANSI, locations of significant species should be protected from incompatible management activities, wherever possible. Forest and grassland management should not be carried out in natural areas containing high quality habitat and which support a high biotic diversity (see Figure 17).

The physical and vegetational characteristics of the dyked marsh areas should be designed to accommodate the specific habitat requirements of both waterfowl and non-

waterfowl bird species. Floating mats of aquatic vegetation should be provided as nesting sites for rare species such as American Coots and Black Terns.

The success of nesting Black Terns is highly dependent upon the maintenance of an optimal balance between emergent vegetation cover and water depths. The three tern colonies which presently exist in the MBPWA (Figure 6) should be closely monitored to ensure that their breeding habitat requirements continue to be met under natural conditions. Judicious management of the waterfowl cells which results in the creation of favourable Black tern habitat could not only promote expansion of the present colonies but also provide alternate nesting sites in the event that future desertion occurs.

Consideration should be given to making structural improvements to the two wooden nesting platforms near One Eye Point in an attempt to attract Ospreys. Additional support could be given to the poles to prevent the platforms from leaning. The area of the platforms should be increased and a rudimentary nest fashioned from sticks should be initiated.

11.4 FISHERIES MANAGEMENT

No loss of fish habitat is expected as the result of proposed dyking and waterfowl cell creation in the MBPWA, as proposed in the draft management plan (OMNR 1989b). The planned cell locations are set back in dense cattail marsh areas with limited or no direct hydrologic connection to the main marsh. Even during periods of high water flow or lake levels, these areas would have no value for fish given the presence of dense stands of emergent vegetation.

The construction of dyked marshes for waterfowl has the added benefit of creating potential habitat for fish production. Dyked cells have been used successfully for northern pike production in Canada and the northern United States (Fago 1977; Forney 1968; Kleinert 1970; McCarraher 1957; Royer 1971). However, in all instances, the production of fish from these controlled marshes required active participation by fisheries managers and/or fish and game clubs. Spawning fish had to be manually collected and the ponds drained at appropriate times.

Pike, walleye, largemouth bass and a variety of forage species lend themselves well to pond rearing. The OMNR has indicated an interest in using the waterfowl cells for this additional purpose but it will require a large commitment of time and energy on a continuous basis to accomplish this.

Some general considerations for fish rearing in the cells are outlined below.

Young fish require an adequate food supply. Zooplankton form an important part of the diet of young walleye and pike. An inadequate supply may encourage early cannibalism (McIntyre *et al.* 1987). It is possible that high turbidity in the North and Coidwater Rivers and their subsequent influence on Matchedash Bay may adversely affect the production of phytoplankton and consequently zooplankton, and also impair visual feeding success.

Prior to investing in fish production in the cells, it is recommended that a study be undertaken to determine the amount of forage base available including zooplankton, benthic invertebrates and fish.

Although no production estimates for the bay are available, it is possible that forage production is presently not sufficient to support the large community of piscivorous fishes that exists. This situation may be potentially worsened if the cells produce additional game fish. Dedicating some cells to the production of forage fish may help alleviate this predator-prey imbalance. Species such as fathead minnows (*Pimephales promelas*) and golden shiners (*Notemigonus crysoleucas*) are preferred forage species and are easily raised in aquaculture ponds.

To maximize fish production and survival, fish should be released to open waters when they have attained a size that permits good survival but before they have reached a size where piscivory, or in the case of a species raised in isolation, cannibalism, becomes the primary feeding mode. In addition, they should be released before environmental conditions in the cells exceed physiological preferences, particularly in the case of temperature.

Both pike and walleye become piscivorous at an early age. Providing sufficient food in the cells, either in the form of plankton or forage fish, may delay or offset piscivory.

Dyked marshes to be used for fish production should be flooded to between 0.6 to 1.25 m deep. Filling should take place in very early spring in preparation for pike and walleye use.

The cell proposed to be constructed on Thiffault Creek, could have a 'swim in' feature incorporated into its design to reduce the management effort required in getting spawning pike into the cell. Pike are not jumpers and will therefore require a low gradient entrance.

Alternatively, manual placement of the spawners directly into the cell will ensure that the optimum numbers of fish per acre are stocked. According to Fago (1977) the optimum number of female pike per acre is 10 to 15, plus 2 to 3 males for each female.

The cells should be designed to allow complete draining to ensure that no fish remain prior to duck nesting. A direct, stream-like outlet allows the juveniles to move out of the cell when ready.

It is anticipated that the cells which are proposed to be constructed in the southern part of the MBPWA will rely on water from the North or Coldwater Rivers. These cells could serve as sedimentation basins which may have a positive benefit on water quality throughout the bay. However, since these areas will also gradually fill in they will require periodic maintenance in the form of dredging.

Cells to be used for pike could be created over mowed cattails to provide suitable spawning substrate.

Pike should be allowed to emigrate from cells shortly after hatching, generally in late April or early May when they have attained a length of 20 mm (Forney 1968). Releasing them at approximately 50 mm will increase survival but reduce the incidence

of cannibalism (McCarraher 1957). Survival will be further increased by holding the fish until they are 75-100 mm in length but fewer fish will be produced (Fago 1977). Generally, pike should be released around late May or before water temperatures become excessive. While larval pike have a higher physiological optimum than adults, and are able to tolerate low dissolved oxygen conditions (Casselman 1978), maintaining optimum environmental conditions should also enhance survival.

Little information is available for walleye production in artificially created ponds. McIntyre *et al.* (1987) found that pond reared walleye were about 46 mm long at the end of June. At this size there was limited piscivory. Sixty millimetres was considered to mark the onset of piscivory and by 100 mm it was noted to be the species' primary mode of feeding. Without an abundant forage base, fish should likely be released around the end of June.

Forage species generally spawn in the summer so timing of their release is not critical.

Largemouth bass could also be produced in the cells. However, adequate spawning and rearing areas for this species are already present in Matchedash Bay.

Although the dyked marshes may be managed so as to serve the dual function of waterfowl and fish production, it is important to recognize that conflicts may arise which reduce the potential for one or the other. For example, the ideal time for the draining of cells designated for walleye production (i.e., late June) is likely to coincide with the peak of duck brood production.

An additional concern is the potential for increased duckling predation by northern pike. Unless detained, adult pike will leave the cells shortly after spawning, and juveniles should be released by the end of May to prevent predation.

Dykes intended to promote pike or walleye spawning will probably experience little competition from other fish species. Juvenile yellow perch are abundant in the bay. As they are also a coolwater species, perch will likely remain active throughout the year. Direct passage channels designed for adult pike will likely present a major obstacle to

the movement of young or small fishes. Other major competitors in the bay are centrarchids which, being warm water species, will likely remain inactive until waters begin to warm. General strategies to improve environmental conditions in the bay should be implemented to complement fish production activities.

Carp populations in Matchedash Bay are abundant. While young carp may provide an important forage base, the adults have few predators. Possible measures to control the populations of this nuisance species include the issuance of commercial fish licences and staging carp derbies. Bringing about a reduction in the area's carp population will reduce competition and habitat damage.

The North and Coldwater Rivers contribute a considerable suspended sediment load to the bay. While low levels can provide a form of cover for fish, higher levels may impair visual feeding success and fish health, and blanket substrates, thereby killing fish eggs.

Habitat improvement in other areas of the marsh should be a fisheries management priority as it could result in increased fish production and could be achieved without the same intensity of labour required to stock the cells.

Over time, organic matter from years of plant growth and decay has accumulated on the bottom of Matchedash Bay. Eventually water levels have been reduced and aquatic plants have given way to wetland species. This process has been accelerated by cultural inputs including nutrient enrichment and sediment loading. In Matchedash Bay, both natural and anthropogenic processes have been affecting the North, West and Catfish Bays in particular.

In order to increase spawning and rearing area in these bays, the bottom requires re-contouring and deepening. Strips or pools, at least 1 m in depth should be created to enhance water depths available for a variety of sizes and species of fish, and to encourage a number of different aquatic plants. Portions of these bays are considered to be shallow water barrens characterized by poor water depths and low plant diversity (Figure 5). Connections to the river or bay should also be deepened, encouraging movement between open waters and sheltered areas.

Additionally, these bays are largely surrounded by cattail stands. While pike may use the flooded margins of these bays for spawning, dense mats of short vegetation are preferred (McCarraher and Thomas 1972). Mowing cattails along the margins of the bays may improve spawning habitat for pike.

11.5 FUTURE MONITORING

An integral part of the MBPWA management plan is the OMNR's commitment to carry out an evaluation program. One of the primary objectives of this program, namely to establish a set of baseline data regarding the biological, physical, hydrological, and archaeological resources of the area which can be compared with the results of future monitoring to assess changing conditions and the effectiveness of management, has been achieved with this study.

It is recommended that future monitoring be designed to replicate, wherever possible, the various field studies undertaken in 1989. This includes the following:

- biannual waterfowl staging counts (spring and fall)
- annual waterfowl brood counts (mid-summer)
- monthly water quality and water level measurements (April-November)
- fish and wildlife habitat assessment
- rare species monitoring

Waterfowl staging and brood counts should follow the methodologies outlined in Section 2.0. Specific locations of the survey route are shown on maps on file with the Huronia District office of the OMNR, Midhurst. Given the large size of the MBPWA a line-transect survey using a helicopter is the most efficient and reliable method of obtaining quantitative estimates of waterfowl use.

The cost of renting a helicopter for the 3 to 4 hours required to adequately cover the study area makes this an expensive survey technique (approximately \$2250/flight in 1989). However, it is the contention of Nelson and Phillips (1983) that the manpower and number of repeat visits required to adequately survey waterfowl over a large area

from the ground and boats far outweighs the cost of using helicopters. Furthermore, the population data obtained from the aerial survey are much more accurate than those obtained at ground level. Evidence that this is the case in Matchedash Bay is found by comparing Rombach and Craig's (1981) relatively scant waterfowl data against the 1989 results.

Surface water quality sampling at the stations established in Matchedash Bay in 1989 should continue to be conducted between 4 to 6 times/year under ice free conditions. The addition of one mid-winter monitoring event would also be beneficial. The same parameters measured in 1989, particularly phosphorus and chlorophyll *a* concentrations, turbidity (secchi disc readings) and water temperature and flow rates, should be analyzed. These data will assist in assessing future nutrient and sediment loadings to the bay.

Analysis of existing water quality data (Appendices H and I) indicates that present phosphorus loadings to Matchedash Bay via the Coldwater and North Rivers periodically exceed the PWQO for this parameter by a considerable amount. Future monitoring should investigate the potential implications of dyked marsh creation on nutrient loadings.

Maintaining an equilibrium between macrophyte and phytoplankton production is extremely important to the water quality of the bay. Reducing the standing crop of macrophytes within the study area through the cutting and/or flooding of cattails may upset this equilibrium. If, as expected, phosphorus loadings remain high, an increase in phytoplankton could occur, resulting in the formation of algae blooms and surface scum.

It is recommended that all future water quality monitoring undertaken by the OMNR be coordinated with the OMOE's current initiatives to achieve the objectives of the Severn Sound Remedial Action Plan. A possible nutrient reduction strategy advocated in the management plan is to route effluent discharge from the Coldwater STP into one or more dyked cells where biological wastewater treatment (e.g., nutrient uptake by macrophytes) can occur. While this treatment method is endorsed, recent water quality

data identify agricultural activity in the North River basin as the principal source of nutrients entering Matchedash Bay.

Strong consideration therefore, should also be given to using dyked marsh areas adjacent to the North River for wastewater treatment. However, it is important to recognize that the potential hydrological benefits accrued by employing these areas as primary or secondary treatment facilities may be outweighed by the costs (i.e., a reduction in the potential for waterfowl and fish production).

12.0 REFERENCES

Alison, R.M. 1989:

Personal communication. Telephone conversation between R. Alison (Orillia naturalist) and D.M. Fraser (GLL) held on November 3, 1989.

American Ornithologists' Union. 1983:

Check-list of North American Birds. 6th Edition. Allen Press, Lawrence, Kansas. 877 pp.

Anonymous. 1976:

Bird Damage-Coldwater Area, 1976. Soil and Crop Improvement Association. 1 pp. (mimeo).

Anonymous. 1983:

Hydrology Report: Highway 69 Crossing at Narrows of Matchedash Bay. Ontario Ministry of Transportation and Communications Report. Unpublished. 7 pp.

Anonymous. 1989:

ORBBP data summary [List of rare breeding birds of Ontario]. Ontario Rare Breeding Bird Program Newsletter No. 1:2.

Argus, G.W. and D.J. White. 1977:

Atlas of the Rare Vascular Plants of Ontario. Natural Museum of Natural Sciences Syllogeus No. 14, Ottawa.

Argus, G.W., K.M. Pryer, D.J. White, and C.J. Keddy (eds.). 1982-1987:

Atlas of the Rare Vascular Plants of Ontario. Four parts. National Museum of Natural Sciences, Ottawa. (looseleaf).

Bailey, R.G. 1978:

Description of the Ecoregions of the United States. U.S. Department of Agriculture Forest Service, Ogden, Utah.

Baillie, J.L., Jr., and P. Harrington. 1936:

The distribution of breeding birds in Ontario, part 1. Transactions of the Royal Canadian Institute 21:1-150.

Ball, P.W. and D.J. White. 1982:

Eleocharis rostellata. 1 p. in Argus, G.W., K.M. Pryer, D.J. White, and C.J. Keddy (eds.). Atlas of the Rare Vascular Plants of Ontario. Four parts. National Museum of Natural Sciences, Ottawa. (looseleaf).

Banfield, A.W.F. 1974:

The Mammals of Canada. National Museum of Natural Sciences, University of Toronto Press, Toronto. 438 pp.

Bellrose, F.C. 1976:

Ducks, Geese and Swans of North America. 2nd Edition. Stackpole Books, Harrisburg, Pennsylvania. 540 pp.

Bobbette, R.S.W. 1983a:

Matchedash Bay Provincial Wildlife Area Botanical Inventory. Vol. 1. Vegetation Resource Management. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 90 pp.

Bobbette, R.S.W. 1983b:

Matchedash Bay Provincial Wildlife Area 1982. Botanical Inventory Vol. 2. Vegetation and Plant Species. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 93 pp.

Bobbette, R.S.W. 1985:

Ecological Inventory of Conifer Wetlands in Huronia and Muskoka. Great Lakes Forest Research Centre, Canadian Forestry Service.

Borecky, R., and P. Edmunds. 1978:

Status Report on Matchedash Bay. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 19 pp.

Bowles, R. 1989:

Personal communication. Conversation between R. Bowles (local naturalist) and D. Fraser (GLL) held on August 10, 1989.

Cadman, M.D. 1986:

Status report on the Loggerhead Shrike (*Lanius ludovicianus*) in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.

Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner. 1987:

Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo. 617 pp.

Casselman, J.M. 1978:

Effects of environmental factors on growth, survival, activity, and exploitation of northern pike. American Fisheries Society Special Publication 11:114-128.

Chapman, L.J. 1975:

The Physiography of the Georgian Bay - Ottawa Valley Area of Southern Ontario. Ontario Ministry of Natural Resources Geoscience Report No. 128. 33 pp.

Chapman, L.J., and P.F. Putnam. 1984:

The Physiography of Southern Ontario. 3rd Edition. Ontario Geological Survey, Special Volume 2. 270 pp. Accompanied by Map P. 2715, Scale 1:600,000.

Cheskey, T. 1987:

Olive-sided Flycatcher, *Contopus borealis*. pp. 250-251 in Cadman, M.D., P.F.J. Eagles and F.M. Helleiner (eds.). Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo. 617 pp.

Collins, J.M. 1974:

The relative abundance of ducks breeding in southern Ontario in 1951 and 1971. pp. 32-44 in Boyd, H. (ed.). Canadian Wildlife Service Waterfowl Studies in Eastern Canada, 1969-73. CWS Report Series No. 29.

Collins, J.T., R. Conant, J.E. Huheey, J.L. Knight, E.M. Rundquist, and H.M. Smith. 1982:

Standard Common and Current Scientific Names for North American Amphibians and Reptiles. 2nd Edition. Society for the Study of Amphibians and Reptiles. Herpetological Circular No. 12. 28 pp.

Cook, F.R. 1984:

Introduction to Canadian Amphibians and Reptiles. National Museum of Natural Sciences, Ottawa. 200 pp.

Cronin, R. 1989:

Personal communication. Meeting between R. Cronin (local trapper) and D.M. Fraser (GLL) held on August 19, 1989.

Deane, R.E. 1950:

Pleistocene Geology of the Lake Simcoe District, Ontario. Geological Survey of Canada Memoir No. 26. Canada Department of Mines and Technical Surveys, Ottawa. 108 pp. and maps.

Dennis, D.G. 1987a:

American Black Duck, *Anas rubripes*. pp. 70-71 in Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo. 617 pp.

Dennis, D.G. 1987b.

Lesser Scaup, *Aythya affinis*. pp. 92-93 in Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo. 617 pp.

Dennis, D.G. 1974:

Breeding pair surveys of waterfowl in southern Ontario. pp. 45-52 in Boyd, H. (ed.). Canadian Wildlife Service Waterfowl Studies in Eastern Canada, 1969-73. CWS Report Series No. 29.

Dennis, D.G. 1989:

Personal communication. Telephone conversation between D. Dennis (Ontario Region, Canadian Wildlife Service, London) and D.M. Fraser (GLL) held on November 10, 1989.

Devitt, O.E. 1967:

The Birds of Simcoe County, Ontario. 2nd Edition, Revised. Brereton Field Naturalists's Club, Barrie. 192 pp.

Diefenbach, D.R. and R.B. Owen, Jr. 1989:

A model of habitat use by breeding American Black Ducks. *Journal of Wildlife Management* 53:383-389.

Dunn, E.A. 1979:

Nesting biology and development of young in Ontario Black Terns. *Canadian Field Naturalist* 93:276-281.

Dunn, E.H. 1987:

Black Tern, *Chlidonias niger*. pp. 192-193 in Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). *Atlas of the Breeding Birds of Ontario*. University of Waterloo Press, Waterloo. 617 pp.

Ecocern Limited, 1987:

Field collection records, Electrofishing Survey, North and Coldwater Rivers. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.

Emms, S. and J. Dobell, 1982:

A Feasibility Study for a North River Fishway. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 29 pp.

Environment Canada and United States Department of the Interior. 1986:

North American Waterfowl Management Plan: A Strategy for Cooperation. Canadian Wildlife Service and U.S. Fish and Wildlife Service. 19 pp.

Fago, D.M. 1977:

Northern Pike Production in Managed Spawning and Rearing Marshes. Technical Bulletin No. 96, Wisconsin Department of Natural Resources, Madison, Wisconsin.

Ferguson, M., R. Black and W. LaFrance. 1986:

Wetland Evaluation and Data Record, Matchedash Bay Wetland (Class 1). Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 14 pp.

Flood, N. 1987:

Orchard Oriole, *Icterus spurius*. pp. 484-485 in Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo.

Forney, J.L. 1968:

Production of young northern pike in a regulated marsh. New York Fish and Game Journal 15:143-154.

Gadawski, T. 1989:

Personal communication. Telephone conversation between T. Gadawski (Biologist, Ducks Unlimited (Canada)) and D. Fraser (GLL) held on May 30, 1989.

Gilbert, F.F., R.J. Brooks, and J.D. Somers. 1979:

Vertebrate Pests, Their Importance, Ecology, and Control. Abstract. 1979 Research Program, Department of Zoology, University of Guelph, Guelph. Unpublished. 9 pp.

Glooschenko, V., B. Parker, L. Loo, R. Kent, C. Wedeles, A. Mason, J. Dawson, D. Herman and P. Smith. 1988:

Provincially and Regionally Significant Wetlands in Southern Ontario: Interim Report 1987. Ontario Ministry of Natural Resources, Wildlife Branch, Queen's Park, Toronto. 321 pp.

Gollop, J.B. and W.H. Marshall. 1954:

A Guide for Aging [sic] Duck Broods in the Field. Mississippi Flyway Council Technical Section. 14 pp.

Goodyear, C.D., T.A. Edsall, D.M. Ormsby Dempsey, G.D. Moss, and P.E. Polanski.
1982:
Atlas of the spawning and nursery areas of Great Lakes fishes. Volume
V: Lake Huron. FWS/OBS-82/52 Fish and Wildlife Service, U.S.
Department of the Interior. Washington, D.C.

Gray, K. 1989:
Letter from Ms K. Gray (Heritage Branch, Archaeology Unit, Ontario
Ministry of Culture and Communications) to D.M. Fraser (GLL) dated
September 6, 1989, regarding known archaeological sites in the
Matchedash Bay project area.

Gregory, W.W. 1983:
A revised check-list of the butterflies and skippers of Canada
(Lepidoptera). Lyman Entomological Museum and Research Laboratory
Memoir 14, No. 14. 39 pp.

Hanna, R. 1984:
Life Science Areas of Natural and Scientific Interest in Site District 6-6:
A Review and Assessment of Significant Natural Areas in Site District 6-
6. Parks and Recreational Areas Section, Ontario Ministry of Natural
Resources, Central Region, Richmond Hill. 81 pp.

Helleiner, F.M. 1987:
Yellow-billed Cuckoo, *Coccyzus americanus*. pp. 200-201 in Cadman,
M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). Atlas of the Breeding
Birds of Ontario. University of Waterloo Press, Waterloo. 617 pp.

Hess, Q.F. 1982:
Butterflies of Ontario and Summaries of Lepidoptera Encountered in
Ontario in 1981. Toronto Entomologists Association Occasional
Publication #13-82. 68 pp.

Hoffman, D.W., R.E. Wickland and R.R. Richards. 1962:

Soil Survey of Simcoe County, Ontario. Ontario Soil Survey Report No. 29. 109 pp.

Hokanson, K.E.F. 1977:

Temperature requirements of some percids and adaptations to the seasonal temperature cycle. *Journal of the Fisheries Research Board of Canada* 34:1524-1550.

Hunter, A.F. 1900:

Huron village sites in Tay, Simcoe Co. Annual Archaeological Report for the Province of Ontario. in Department of Education Annual Report to the Minister of Education. Vol. 15. Queen's Printer, Toronto.

Hunter, A.F. 1909:

A History of Simcoe County. Vol. I. Barrie, Ontario. 335 pp.

Hunter, J.R. 1976:

An Archaeological Assessment of Highway Corridors 400, 12 and 26, Simcoe County, Ontario. Unpublished report prepared for the Ontario Ministry of Culture and Recreation.

Hunter, J.R. 1989:

An Overview of the Archaeological Resources of Matchedash Bay. Report prepared for Gartner Lee Limited by Archaeological Research Associates. September 1989.

James, R.D., P.L. McLaren, and J.C. Barlow. 1976:

Annotated Checklist of the Birds of Ontario. Life Sciences Miscellaneous Publication, Royal Ontario Museum, Toronto. 75 pp.

Kershaw, L., W. Morton and J. Venn. 1976:

A list of Rare and Endangered Species in the Canadian Flora.
Department of Biology, University of Waterloo, Waterloo.

Kleinert, S.J. 1970:

Production of Northern Pike in a Managed Marsh, Lake Ripley,
Wisconsin. Research Report 49, Department of Natural Resources,
Madison, Wisconsin.

Klinkenberg, B. 1987:

Golden-crowned Kinglet, *Regulus satrapa*. pp. 314-315 in Cadman, M.D.,
P.F.J. Eagles and F.M. Helleiner (eds.). Atlas of the Breeding Birds of
Ontario. University of Waterloo Press, Waterloo. 617 pp.

LaFrance, W. 1979:

Muskrat House Survey, Matchedash Bay and Gray Marsh. Ontario
Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.
5 pp.

LaFrance, W. 1980:

Muskrat House Survey, Matchedash Bay and Gray Marsh. Ontario
Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.
12 pp.

LaFrance, W. 1981:

Muskrat House Survey, Matchedash Bay and Gray Marsh. Ontario
Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.
10 pp.

LaFrance, W. 1983:

Muskrat House Survey, Matchedash Bay and Gray Marsh. Ontario
Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.
11 pp.

LaFrance, W. 1984:

Muskrat House Survey, Matchedash Bay and Gray Marsh. Ontario
Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.
11 pp.

LaFrance, W. 1986:

Muskrat House Count, Matchedash Bay and Gray Marsh. Ontario
Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.
13 pp.

LaFrance, W. 1987:

Muskrat House Count, Matchedash Bay and Gray Marsh. Ontario
Ministry of Natural Resources, Huronia District, Midhurst. Unpublished.
10 pp.

Liberty, B.A. 1969:

Palaeozoic geology of the Lake Simcoe Area, Ontario. Geological Survey
of Canada Memoir 355. Department of Energy Mines and Resources.
201 pp.

Logier, E.B.S. and G.C. Toner. 1961:

Check List of the Amphibians and Reptiles of Canada and Alaska. Life
Science Contribution No. 53, Royal Ontario Museum, Toronto. 92 pp.

Lowney, M.S. and E.P. Hill. 1989:

Wood Duck nest sites in bottomland hardwood forests of Mississippi.
Journal of Wildlife Management 53:378-382.

Lumsden, H.G. 1981:

History of breeding Canada Geese (*Branta canadensis*) in southwestern
Ontario. *Ontario Field Biologist* 35:49-56.

Macdonald, I.D. 1986:

Life Science Areas of Natural and Scientific Interest in Site District 5-7, in Huronia District: A review and Assessment of Significant Natural Areas in Site District 5-7, in Huronia District. Parks and Recreational Areas Section, Ontario Ministry of Natural Resources, Open File Ecological Report 8602, Central Region, Richmond Hill, Ontario. 137 pp.

Macdonell, A. 1891:

Diary of Governor Simcoe's journey from Humber Bay to Matchedash Bay, 1793. Transactions of the Royal Canadian Institute 1:128-139.

McAllister, D.E., B.J. Parker, and P.M. McKee. 1985:

Rare, Endangered and Extinct Fishes in Canada. National Museum of Canada Syllogeus No. 54, Ottawa. 192 pp.

McCarraher, D.B. 1957:

The natural propagation of northern pike in small drainable ponds. Progressive Fish-Culturist 19:185-187.

McCarraher, D.B. and R.E. Thomas. 1972:

Ecological significance of vegetation to northern pike, *Esox lucius*, spawning. Transactions of the American Fisheries Society 101:560-563.

McCracken, J.D. 1987:

American Coot, *Fulica americana*. pp. 158-159 in Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo. 617 pp.

McGilvery, F.B. 1969:

Survival in wood duck broods. Journal of Wildlife Management 33:73-76.

McIntyre, D.B., F.J. Ward, and G.M. Swanson. 1987:

Factors affecting cannibalism by pond-reared juvenile walleye.
Progressive Fish-Culturist 49:264-269

McLachlin, D.J. and P.H. Van Stam. 1982:

Status Report on Mammals of Matchedash Bay Provincial Wildlife Area.
Ontario Ministry of Natural Resources, Huronia District, Midhurst.
Unpublished. 26 pp.

Miller, L.D. and F.M. Brown. 1981:

A Catalogue/Checklist of the Butterflies of America North of Mexico.
The Lepidopterists' Society Memoir No. 2. 280 pp.

Mills, A. 1981:

A Cottager's Guide to the Birds of Muskoka and Parry Sound.
Ampersand Printing, Guelph. 209 pp.

Nelson, J.W. and D.W. Phillips. 1983:

Cumberland House Waterfowl Surveys Using Helicopter Transects, 1980-1982. Ducks Unlimited (Canada), Winnipeg, Manitoba. Mimeo. 34 pp.

Ontario Eastern Habitat Joint Venture Technical Committee. 1988:

Matchedash Bay: An Ontario Candidate for an Eastern Habitat Joint Venture Under the North American Waterfowl Management Plan.
Ontario Ministry of Natural Resources, Ducks Unlimited (Canada) and Canadian Wildlife Service. 35 pp.

Ontario Ministry of Culture and Communications. 1989:

Printouts of file data, archaeological sites BeGw-13 and BeGw-16.

Ontario Ministry of Natural Resources and Environment Canada. 1984:

An Evaluation System for Wetlands of Ontario South of the Precambrian Shield. 2nd Edition. 169 pp.

Ontario Ministry of Natural Resources. 1987:

Implementation Strategy: Areas of Natural and Scientific Interest. Parks and Recreational Areas Branch, Outdoor Recreation Group, Toronto. 19 pp.

Ontario Ministry of Natural Resources. 1988:

"Endangered" Fishes in Ontario. [Internal memo regarding COSEWIC status of fish]. Mimeo. Sept. 1988.

Ontario Ministry of Natural Resources. 1989a:

Huronian District Fisheries Management Plan, 1989-2000. Huronia District, Midhurst. 63 pp. & map.

Ontario Ministry of Natural Resources. 1989b:

Matchedash Bay Provincial Wildlife Area Draft Management Plan - Huronia District, Midhurst. 35 pp.

Ontario Ministry of the Environment. 1984:

Water Management Goals, Policies, Objectives and Implementation Procedures.

Ontario Ministry of the Environment. 1987:

Report on the 1986 Discharges from Municipal Wastewater Treatment Facilities in Ontario. Municipal Section, MISA Office, Water Resources Branch, Toronto.

Ontario Ministry of the Environment. 1988:

Severn Sound Remedial Action Plan. Part 1 - Environmental conditions and problem definitions.

Parker, B. and P. McIlree. 1984:

Status of the Spotted Gar, *Lepisosteus oculatus*, in Canada. Canadian Field Naturalist 98:80-86.

Plourde, S.A., E.L. Szepesi, J.L. Riley, M.J. Oldham, and C. Campbell. 1989:

Distribution and Status of the Herpetofauna of Central Region. Ontario Ministry of Natural Resources, Parks and Recreational Areas Section. Central Region, Richmond Hill. 30 pp.

Prince, H.H. 1968:

Nest sites of Wood Ducks and Common Goldeneyes in New Brunswick. Journal of Wildlife Management 32:489-500.

Reznicek, A.A. 1974:

Letter to Jim Barker, Regional Lands Coordinator, Huntsville District, OMNR, regarding significant and/or sensitive areas in Matchedash Township, Simcoe County.

Reznicek, A.A. 1989a:

Personal communication. Telephone conversation between Dr. Reznicek (Curator, University of Michigan Herbarium, Ann Arbor) and D.M. Fraser (GLL) held on October 11, 1989.

Reznicek, A.A. 1989b:

Personal communication. Letter from Dr. Reznicek (Curator, University of Michigan Herbarium, Ann Arbor) to D. Fraser (GLL) dated November 8, 1989.

Reznicek, A.A. 1987:

Simcoe County rare plants. Ontario Ministry of Natural Resources, Central Region, Richmond Hill. Unpublished manuscript. 12 pp.

Reznicek, A.A. and R.S.W. Bobbette. 1974:

Distribution Maps of Simcoe Vascular Plants. Unpublished Draft report, 11 volumes.

Riley, J.L. 1989:

Distribution and Status of the Vascular Plants of Central Region, Ontario Ministry of Natural Resources, Parks and Recreational Areas Section, OMNR. Open File Ecological Report SR8902. Central Region, Richmond Hill. 110 pp.

Risley, C.J. 1982:

The status of the Red-shouldered Hawk (*Buteo lineatus*) in Ontario, with an overview of the status in Canada. Committee on the Status of Endangered Wildlife in Canada, Ottawa.

Robb, J.R. 1985:

Importance of nesting cavities and brood habitat to Wood Duck production. Annual Report Ohio Cooperative Fish and Wildlife Research Unit, Columbus, Ohio. 26 pp.

Robins, C.R., R.M. Bailey, C.E. Bond, J.R. Brooker, E.A. Lachner, R.N. Lea and W.B. Scott. 1980:

A List of Common and Scientific Names of Fishes from the United States and Canada. 4th Edition. American Fisheries Society, Special Publication No. 12. Bethesda, Maryland.

Rombach, I., and R.E. Craig. 1981:

Waterfowl Survey, Matchedash Bay. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 17 pp.

Rowe, J.S. 1972:

Forest Regions of Canada. Department of Fisheries and the Environment. Canadian Forestry Service, Publication No. 1300. 172 pp. & map.

Royer, L.M. 1971:

Comparative production of pike fingerlings from adult spawners and from fry planted in a controlled spawning marsh. *Progressive Fish-Culturist* 33:153-155.

Rusthoven, J.J., J.R. Hunter and M. Towne. 1987:

George Cowan (alias J.B. Constant): The Recorded Life of an Early Fur Trader and His Contributions to the History of Upper Canada. Unpublished manuscript.

Sandilands, A. 1987:

Green-winged Teal, *Anas crecca*. pp. 68-69 in Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). *Atlas of the Breeding Birds of Ontario*. University of Waterloo Press, Waterloo. 617 pp.

Scott, W.B. and E.J. Crossman. 1973:

Freshwater Fishes of Canada. Bulletin 184, Fisheries Research Board of Canada, Ottawa.

Sen, A.R. 1982:

A review of some important techniques in sampling wildlife. *Canadian Wildlife Service Occasional Paper No. 49*. 15 pp.

Smith, P.G.R. 1987:

Towards the Protection of Great Lakes Natural Heritage Areas. Technical Paper No. 2, Heritage Resources Centre, University of Waterloo, Waterloo. 164 pp.

- Somers, J.D., R.G. Gartshore, F.F. Gilbert, and R.J. Brooks. 1981:
Movements and habitat use by depredating red-winged blackbirds in
Simcoe County, Ontario. *Canadian Journal of Zoology* 59:2206-2214.
- Spiers, J.M. 1985:
Birds of Ontario. Vol. II. Natural Heritage/Natural History Inc.,
Toronto. 986 pp.
- Stewart, A.J. 1976:
A Status Report on Matchedash Bay. Ontario Ministry of Natural
Resources, Huronia District, Midhurst. Unpublished. 11 pp.
- Stirrett, G.M. and R.D. Harris. 1951:
Preliminary report - waterfowl breeding survey in southern Ontario, 1951.
Canadian Wildlife Service Completion Report No. 382. 14 pp.
- Sutherland, D.A. and M.E. Gartshore. 1987:
Blue-gray Gnatcatcher, *Poliophtila caerulea*. pp. 318-319 in Cadman, M.D.,
P.F.J. Eagles and F.M. Helleiner (eds.). Atlas of the Breeding Birds of
Ontario. University of Waterloo Press, Waterloo. 617 pp.
- Van Patter, M. and S. Hilts. 1985:
Some Important Wetlands of Ontario South of the Precambrian Shield.
Federation of Ontario Naturalists, Don Mills. 103 pp.
- Van Stam, P.H. and D.J. McLachlin. 1982a:
Status Report on the Birds of Matchedash Bay Provincial Wildlife Area.
Ontario Ministry of Natural Resources, Huronia District, Midhurst.
Unpublished. 43 pp.

- Van Stam, P.H. and D.J. McLachlin. 1982b:
Status Report on the Herptiles of Matchedash Bay Provincial Wildlife Area. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 16 pp.
- Van Stam, P.H., and D.J. McLachlin, 1982c:
Status Report on the Fisheries of Matchedash Bay Provincial Wildlife Area. Ontario Ministry of Natural Resources, Huronia District, Midhurst. Unpublished. 16 pp.
- Van Zyll de Jong, C.G. 1983:
Handbook of Canadian Mammals. Vol. 1. Marsupials and Insectivores. National Museum of Natural Sciences, Ottawa.
- Wake, D.G., J.J. Desrochers, A. McConnell and D.A. Walker. 1987:
Environment Study Report: Highway 400/69. Ontario Ministry of Transportation and Communications Report. 18 pp.
- Weller, W.F. and M.J. Oldham (eds.). 1988:
Ontario Herpetofaunal Summary 1986. Ontario Field Herpetologists. 221 pp.
- Woodliffe, P.A. 1987:
Least Bittern, *Ixobrychus exilis*. pp. 48-49 in Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner (eds.). Atlas of the Breeding Birds of Ontario. University of Waterloo Press, Waterloo. 617 pp.
- Zeidler, W. 1989:
Personal communication. Conservation between W. Zeidler (local camp operator) and J. Kamstra (GLL) on May 10, 1989.

APPENDIX A

**DATA SHEETS ON KNOWN ARCHAEOLOGICAL SITES,
MATCHEDASH BAY AREA (OMCC 1989)
(Contact OMCC for these data)**

APPENDIX B

**LIST OF PLANT SPECIES RECORDED IN
MATCHEDASH BAY PROVINCIAL WILDLIFE AREA**

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>LYCOPODIACEAE</u>	<u>CLUBMOSS FAMILY</u>	
<i>Lycopodium annotinum</i> L.	Stiff Clubmoss	1
<i>Lycopodium digitatum</i> Rr.	Crowfoot Clubmoss	1
<i>Lycopodium lucidulum</i> Michx.	Shining Clubmoss	1
<i>Lycopodium obscurum</i> L.	Ground-pine	1
<u>SELAGINELLACEAE</u>	<u>SPIKEMOSS FAMILY</u>	
<i>Selaginella rupestris</i> (L.) Spring	Rock Spikemoss	1
<u>EQUISETACEAE</u>	<u>HORSETAIL FAMILY</u>	
<i>Equisetum arvense</i> L.	Field Horsetail	1,3,5
<i>Equisetum fluviatile</i> L.	Water Horsetail	3,6
<u>OPHIOGLOSSACEAE</u>	<u>ADDER'S-TONGUE FAMILY</u>	
<i>Botrychium dissectum</i> Spreng.	Dissected Grape Fern	1
<i>Botrychium virginianum</i> (L.) Sw.	Rattlesnake Fern	1
<u>OSMUNDACEAE</u>	<u>ROYAL FERN FAMILY</u>	
<i>Osmunda cinnamomea</i> L.	Cinnamon Fern	1
<i>Osmunda regalis</i> L.	American Royal Fern	1,6
var. <i>spectabilis</i> (Willd.) Gray		
<u>DENNSTAEDTIACEAE</u>	<u>BRACKEN FAMILY</u>	
<i>Pteridium aquilinum</i> (L.) Kuhn	Eastern Bracken	1,3,4,5
var. <i>latiusculum</i> (Desv.) Underw.		

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>ADIANTACEAE</u>	<u>MAIDENHAIR FERN FAMILY</u>	
<i>Adiantum pedatum</i> L.	Northern Maidenhair Fern	1
<u>ASPLENIACEAE</u>	<u>SPLEENWORT FAMILY</u>	
<i>Athyrium filix-femina</i> (L.) Roth var. <i>michauxii</i> (Spreng.) Fern.	Northeastern Lady Fern	1
<i>Cystopteris fragilis</i> (L.) Bernh.	Fragile Fern	3
<i>Dryopteris carthusiana</i> (Vill.) H.P. Fuchs	Spinulose Wood Fern	1
<i>Dryopteris clintoniana</i> (D.C. Eat.) Dowell	Clinton's Wood Fern	1
<i>Dryopteris cristata</i> (L.) Gray	Crested Wood Fern	1
<i>Dryopteris intermedia</i> (Willd.)	Glandular Wood Fern	1
<i>Dryopteris marginalis</i> (L.) Gray	Marginal Wood Fern	1
<i>Matteuccia struthiopteris</i> (L.) Todaro	American Ostrich Fern	1
<i>Onoclea sensibilis</i> L.	Sensitive Fern	1,5,6
<i>Polystichum acrostichoides</i> (Michx.) Schott	Christmas Fern	1
<u>THELYPTERIDACEAE</u>	<u>BEECH FERN FAMILY</u>	
<i>Thelypteris palustris</i> (Salisb.) Schott	Marsh Fern	6

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>POLYPODIACEAE</u>	<u>POLYPODY FAMILY</u>	
<i>Polypodium virginianum</i> L.	Rock Polypody	3
<u>TAXACEAE</u>	<u>YEW FAMILY</u>	
<i>Taxus canadensis</i> Marsh.	American Yew	1
<u>PINACEAE</u>	<u>PINE FAMILY</u>	
<i>Abies balsamea</i> (L.) Mill.	Balsam Fir	1
<i>Larix laricina</i> (Du Roi) K. Koch	Tamarack	1,6
<i>Picea glauca</i> (Moench) Voss	White Spruce	1
<i>Picea mariana</i> (Mill.) BSP.	Black Spruce	1
<i>Pinus strobus</i> L.	White Pine	1,3,4
<i>Tsuga canadensis</i> (L.) Carr.	Eastern Hemlock	1
<u>CUPRESSACEAE</u>	<u>CYPRESS FAMILY</u>	
<i>Juniperus communis</i> L.	Common Juniper	4
var. <i>depressa</i> Pursh		
<i>Juniperus virginiana</i> L.	Red Cedar	3,5
<i>Thuja occidentalis</i> L.	White Cedar	1,3
<u>TYPHACEAE</u>	<u>CATTAIL FAMILY</u>	
<i>Typha angustifolia</i> L.	Narrow-leaved Cattail	6
<i>Typha latifolia</i> L.	Common Cattail	3,6
<i>Typha Xglauca</i> Godr.	Hybrid Cattail	6

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>SPARGANIACEAE</u>	<u>BUR-REED FAMILY</u>	
<i>Sparganium chlorocarpum</i> Rydb.	Green-fruited Bur-reed	6
<i>Sparganium eurycarpum</i> Engelm.	Giant Bur-reed	6
<u>ZOSTERACEAE</u>	<u>PONDWEED FAMILY</u>	
<i>Potamogeton crispus</i> L.	Curly-leaved Pondweed *	7
<i>Potamogeton foliosus</i> Raf.	Pondweed	7
<i>Potamogeton friesii</i> Rupr.	Frie's Pondweed	7
<i>Potamogeton berchtoldii</i> Fieber	Pondweed	7
<i>Potamogeton natans</i> L.	Floating Pondweed	7
<i>Potamogeton pectinatus</i> L.	Sago Pondweed	7
<i>Potamogeton richardsonii</i> (Bennet) Rydb.	Richardson's Pondweed	7
<i>Potamogeton zosteriformis</i> Fern.	Flat-stemmed Pondweed	7
<u>NAJADACEAE</u>	<u>NAIAD FAMILY</u>	
<i>Najas flexilis</i> (Willd.) R. & S.	Bushy Naiad	7
<u>ALISMATACEAE</u>	<u>WATER-PLANTAIN FAMILY</u>	
<i>Alisma plantago-aquatica</i> L.	Water-plantain	6
<i>Sagittaria latifolia</i> Willd.	Arrowhead	6,7
<i>Sagittaria rigida</i> Pursh	Arrowhead	7
<u>HYDROCHARITACEAE</u>	<u>FROG'S-BIT FAMILY</u>	
<i>Elodea canadensis</i> Michx.	Elodea	7
<i>Vallisneria americana</i> Michx.	Tape Grass	7

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>POACEAE</u>	<u>GRASS FAMILY</u>	
<i>Agropyron repens</i> (L.)	Quack Grass *	5
<i>Agropyron trachycaulam</i> (Link) Malte	Slender Wheat Grass	5
<i>Agrostis gigantea</i> Roth.	Redtop *	5
<i>Agrostis scabra</i> Willd.	Ticklegrass *	3,6
<i>Agrostis stolonifera</i> L.	Creeping Bent Grass	3,5
<i>Brachyelytrum erectum</i> (Roth.) Beauv.	Bearded Shorthusk	
<i>Bromus ciliatus</i> L.	Fringed Brome Grass	6
<i>Bromus inermis</i> Leyss.	Smooth Brome Grass *	5
<i>Bromus latiglumis</i> (Shear) A.S. Hitchc.	Tall Brome Grass	5
<i>Calamagrostis canadensis</i> (Michx.) Beauv.	Canada Blue-joint	5,6
<i>Cinna arundinacea</i> L.	Stout Wood Grass	1
<i>Cinna latifolia</i> (Goepp.) Griseb.	Nodding Wood Grass	1
<i>Dactylis glomerata</i> L.	Orchard Grass *	5
<i>Danthonia spicata</i> (L.) R. & S.	Poverty Oat Grass	3
<i>Deschampsia flexosa</i> (L.) Beauv.	Dryland Hair Grass	3
<i>Echinochloa muricata</i> (Beauv.) Fern.	Barnyard Grass	6
<i>Elymus hystrix</i> L.	Bottle-brush Grass	1
<i>Elymus villosus</i>	Hairy Wild-rye	1
<i>Elymus virginicus</i> L.	Virginia Wild-rye	1
<i>Festuca obtusa</i> Biehl.	Nodding Fescue	1
<i>Festuca pratensis</i> Huds.	Meadow Fescue *	1,5
<i>Festuca rubra</i> L.	Red Fescue	5
<i>Glyceria borealis</i> (Nash) Batch.	Northern Manna Grass	1
<i>Glyceria canadensis</i> (Michx.) Trin.	Rattlesnake Manna Grass	6
<i>Glyceria grandis</i> S. Wats.	Tall Manna Grass	6
<i>Glyceria striata</i> (Lam.) A.S.	Fowl Manna Grass	1,3

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Hierochloa odorata</i> (L.) Beauv.	Sweet Grass	3,6
<i>Hordeum jubatum</i> L.	Foxtail Barley *	5
<i>Leersia oryzoides</i> (L.) Sw.	Cut Grass	6,7
<i>Milium effusum</i> L.	Wood Millet	
<i>Muhlenbergia mexicana</i> (L.) Trin.	Muhly Grass	3
<i>Oryzopsis asperifolia</i> Michx.	Rough-leaved Mountain-rice	
<i>Panicum capillare</i> L.	Witch Grass	4,5
<i>Panicum lanuginosum</i> Ell.	Panic Grass	
<i>Panicum gattingeri</i> Nash	Gattinger's Panic Grass	5
<i>Panicum linearifolium</i> Britt.	Narrow-leaved Panic Grass	5
<i>Phalaris arundinacea</i> L.	Reed Canary Grass	6
<i>Phleum pratense</i> L.	Timothy *	5
<i>Phragmites australis</i> (Cav.) Trin. ex Steud.	Common Reed	6
<i>Poa annua</i> L.	Annual Blue Grass	5
<i>Poa compressa</i> L.	Canada Blue Grass	3,4,5
<i>Poa palustris</i> L.	Fowl Manna Grass	
<i>Poa pratensis</i> L.	Kentucky Blue Grass	2,3,4,5
<i>Schizachne purpurascens</i> (Torr.) Sw.	False Melic Grass	
<i>Setaria glauca</i> (L.) Beauv.	Yellow Foxtail	5
<i>Setaria viridis</i> (L.) Beauv.	Green Foxtail	5
<i>Spartina pectinata</i> Link	Cord Grass	3
<i>Zizania palustris</i> L.	Wild Rice	7
<u>CYPERACEAE</u>	<u>SEDGE FAMILY</u>	
<i>Carex alopecoidea</i> Tuckerm.	Sedge	3
<i>Carex amphibola</i> Steudel	Sedge	1
<i>Carex aquatilis</i> Wahl.	Sedge	1,3,6
<i>Carex atherodes</i> Sprengel	Sedge	6

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Carex aurea</i> Nutt.	Sedge	5,6
<i>Carex bebbii</i> (Bailey) Fern.	Sedge	3,5,6
<i>Carex blanda</i> Dew.	Sedge	1,5
<i>Carex brevior</i>	Sedge	6
<i>Carex brunnescens</i> (Pers.) Poir.	Sedge	1
<i>Carex buxbaumii</i> Wahl.	Sedge	6
<i>Carex castanea</i> Wahl.	Sedge	
<i>Carex cephaloidea</i> (Dew.) Dew	Sedge	1
<i>Carex comosa</i> Boott	Sedge	1,3,6
<i>Carex crawfordii</i> Fern.	Sedge	7
<i>Carex crinita</i> Lam.	Sedge	1
<i>Carex cristatella</i> Britt.	Sedge	3,5,6
<i>Carex curta</i> Gooden	Sedge	3
<i>Carex deweyana</i> Schw.	Sedge	3
<i>Carex diandra</i> Schrank	Sedge	3
<i>Carex disperma</i> Dew.	Sedge	1
<i>Carex flava</i> L.	Sedge	3,6
<i>Carex gracillima</i> Schw.	Sedge	1,3
<i>Carex granularis</i> Muhl. ex Willd	Sedge	3,5,6
<i>Carex gynocrates</i> Drejer	Sedge	6
<i>Carex hirtifolia</i> Mack	Sedge	
<i>Carex hystericina</i> Muhl. ex Willd.	Sedge	6
<i>Carex interior</i> Bailey	Sedge	1,6
<i>Carex intumescens</i> Rudge	Sedge	1
<i>Carex lacustris</i> Willd.	Sedge	1,5,6,7
<i>Carex languinosa</i> Michx.	Sedge	3,6
<i>Carex lasiocarpa</i> Ehrh.	Sedge	6
<i>Carex laxiflora</i> Lam.	Sedge	
<i>Carex leptalea</i> Wahl.	Sedge	1

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Carex limosa</i> L.	Sedge	1,6
<i>Carex lupulina</i> Muhl. ex Willd.	Sedge	1,3
<i>Carex lurida</i> Wahl	Sedge	6
<i>Carex merritt-fernaldii</i> Mack.	Sedge	3,5
<i>Carex paupercula</i> Michx.	Sedge	
<i>Carex pedunculata</i> Muhl. ex Willd.	Sedge	1
<i>Carex prairea</i> Dew.	Sedge	3
<i>Carex projecta</i> Mack.	Sedge	3
<i>Carex pseudocyperus</i> L.	Sedge	6
<i>Carex retrorsa</i> Schw.	Sedge	3,6
<i>Carex rosea</i> Schk. ex Willd.	Sedge	1
<i>Carex rostrata</i> Stokes	Sedge	3,6,7
<i>Carex scoparia</i> Muhl. ex Willd.	Sedge	1,5,6
<i>Carex sparganioides</i> Muhl. ex Willd.	Sedge	1
<i>Carex spicata</i> Huds.	Sedge *	3
<i>Carex sprengelii</i> Dew. ex Spreng.	Sedge	1,3
<i>Carex stipata</i> Muhl. ex Willd.	Sedge	1,3,6
<i>Carex stricta</i> Lam.	Sedge	1,6
<i>Carex tenera</i> Dew.	Sedge	
<i>Carex trisperma</i> Dew.	Sedge	1
<i>Carex tuckermanii</i> Boott ex Dew.	Sedge	1
<i>Carex umbellata</i> Willd	Sedge	3
<i>Carex vulpinoidea</i> Michx.	Sedge	3,5,6
<i>Cladium maricoides</i> (Mahl.) Torrey	Twig Rush	6
<i>Eleocharis erythropoda</i> Steud.	Spike-rush	1,3,6
<i>Eleocharis obtusa</i> (Willd.)	Spike-rush	6
<i>Eleocharis pauciflora</i> (Lightf.) Link	Spike Rush	6
<i>Eleocharis rostellata</i> Torrey	Spike-rush	6

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Eleocharis smallii</i> Britt.	Spike-rush	3
<i>Eriophorum virginicum</i> L.	Tawny Cotton-Grass	6
<i>Rhynchospora alba</i> (L.) Vahl	White Beak-rush	6
<i>Scirpus acutus</i> Muhl.	Hard-stemmed Bulrush	6,7
<i>Scirpus americanus</i> Pers.	American Bulrush	6
<i>Scirpus atrovirens</i> Willd.	Black Bulrush	1,5,6
<i>Scirpus cyperinus</i> (L.) Kunth	Wool-grass	1,3,5,7
<i>Scirpus fluviatilis</i> (Torr.) Gray	River Bulrush	6,7
<i>Scirpus hudsonianus</i> (Michaux) Fern	Hudson Bulrush	6
<i>Scirpus rubrotinctus</i> Fern.	Bulrush	6
<i>Scirpus validus</i> Vahl.	Softstem Bulrush	6,7
<u>ARACEAE</u>	<u>ARUM FAMILY</u>	
<i>Acorus calamus</i> L.	Sweet Flag	3,6
<i>Arisaema triphyllum</i> (L.) Schott	Jack-in-the-pulpit	1
<i>Calla palustris</i> L.	Water-arum	6
<u>LEMNACEAE</u>	<u>DUCKWEED FAMILY</u>	
<i>Lemna minor</i> L.	Common Duckweed	7
<i>Lemna trisulca</i> L.	Star Duckweed	7
<i>Spirodela polyrhiza</i> (L.) Schleid.	Greater Duckweed	7
<i>Wolffia columbiana</i> Karst.	Water-meal	7
<i>Wolffia punctata</i> Griseb	Water-meal	7

Vegetation Communities

1 - Forest

2 - Parkland

3 - shrub

4 - Barren Rock

5 - Open Upland

6 - Open Wetland

7 - Aquatic

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>PONTEDERIACEAE</u>	<u>PICKERELWEED FAMILY</u>	
<i>Heteranthera dubia</i> (Jacq.) MacM.	Water Star-grass	7
<i>Pontederia cordata</i> L.	Pickerelweed	6,7
<u>JUNCACEAE</u>	<u>RUSH FAMILY</u>	
<i>Juncus bufonius</i> L.	Toad Rush	1
<i>Juncus canadensis</i> La Harpe	Rush	6
<i>Juncus dudleyi</i> Wieg.	Rush	3,5
<i>Juncus effusus</i> L.	Rush	1,6
<i>Juncus nodosus</i> L.	Rush	6
<i>Juncus tenuis</i> Willd.	Path Rush	3,5,6
<u>LILIACEAE</u>	<u>LILY FAMILY</u>	
<i>Allium canadense</i> L.	Wild Garlic	1,2,3
<i>Allium schoenoprasum</i> L.	Chives	4
<i>Allium tricoccum</i> Ait.	Wild Leek; Ramps	1
<i>Clintonia borealis</i> (Ait.) Raf.	Bluebead-lily	1
<i>Erythronium americanum</i> Ker	Yellow Trout Lily	1
<i>Lilium philadelphicum</i> L.	Wood Lily	6
<i>Maianthemum canadense</i> Desf.	Wild-lily-of-the-Valley	1,3,6
<i>Polygonatum pubescens</i> (Willd.) Pursh	Solomon's-seal	1
<i>Smilacina racemosa</i> (L.) Desf.	False Solomon's-seal	1,3
<i>Smilacina stellata</i> (L.) Desf.	False Solomon's-seal	1,6
<i>Smilacina trifolia</i> (L.) Desf.	Three-leaved False Solomon's-seal	1
<i>Smilax herbacea</i> L.	Carrion-flower	1,5
<i>Smilax hispida</i> Torr.	Bristly Greenbrier	1

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Streptopus roseus</i> Michx.	Twisted Stalk	1
<i>Tofieldia glutinosa</i> (Michx.) Pers.	False Asphodel	1
<i>Trillium cernuum</i> L.	Nodding Trillium	1
<i>Trillium erectum</i> L.	Purple Trillium	1
<i>Trillium grandiflorum</i> (Michx.)	White Trillium	1
<i>Trillium undulatum</i>	Painted Trillium	1
<i>Uvularia grandiflora</i> Sm.	Bellwort	1
<u>IRIDACEAE</u>	<u>IRIS FAMILY</u>	
<i>Iris versicolor</i> L.	Wild Blue Flag	1,3,6
<i>Sisyrinchium angustifolium</i> Miller	Narrow Blue-eyed Grass	5
<i>Sisyrinchium montanum</i> Greene	Little Blue-eyed Grass	5,6
<u>ORCHIDACEAE</u>	<u>ORCHID FAMILY</u>	
<i>Calopogen tuberosus</i> (L.)	Calopogon	6
<i>Corallorhiza trifida</i> Chat.	Early or Pale Coral-root	1
<i>Cypripedium calceolus</i> L.	Yellow Lady-slipper	1,6
<i>Cypripedium reginae</i> Walt.	Showy Lady-slipper	1,6
<i>Epipactis helleborine</i> (L.) Crantz	Helleborine	1
<i>Liparis loeselii</i> (L.) Rich.	Loesel's Twayblade; Fen Orchid	6
<i>Platanthera hyperborea</i> (L.) Lindley	Northern Green Orchid	1,6
<i>Platanthera lacera</i> (Michx.)	Ragged-fringed Orchid	5
<i>Platanthera obtusata</i> (Banks ex Prsh) Lindl.	Northern Bog Orchid	1
<i>Platanthera psychodes</i> (L.) Lindl.	Purple-fringed Orchid	1
<u>SALICACEAE</u>	<u>WILLOW FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Populus balsamifera</i> L.	Balsam Poplar; Hackmatack	1,2,3
<i>Populus grandidentata</i> Michx.	Large-toothed Aspen	1
<i>Populus tremuloides</i> Michx.	Trembling Aspen	1,2,3,4,5
<i>Salix amygdaloides</i> Anderss.	Peach-leaved Willow	3,6
<i>Salix bebbiana</i> Sarg.	Beaked Willow; Bebb's Willow	3
<i>Salix candida</i> Willd.	Hoary Willow	6
<i>Salix discolor</i> Muhl.	Pussy Willow	3,6
<i>Salix eriocephala</i> Michx.	Heart-leaved Willow	3,6
<i>Salix exigua</i> Nutt.	Sandbar Willow	3
<i>Salix fragilis</i> L.	Crack Willow	1,3,6
<i>Salix lucida</i> Muhl.	Shining Willow	3,6
<i>Salix petiolaris</i> Sm.	Slender Willow	3
<u>MYRICACEAE</u>	<u>WAX MYRTLE FAMILY</u>	
<i>Myrica gale</i> L.	Sweet Gale	3,6
<u>JUGLANDACEAE</u>	<u>WALNUT FAMILY</u>	
<i>Juglans cinerea</i> L.	Butternut	1
<u>BETULACEAE</u>	<u>BIRCH FAMILY</u>	
<i>Alnus rugosa</i> (Duroi) Spreng.	Speckled Alder	1,3
<i>Betula alleghaniensis</i> Britt.	Yellow Birch	1
<i>Betula papyrifera</i> Marsh.	White Birch	1,3
<i>Carpinus caroliniana</i> Walt.	Blue Beech; Hornbeam	1
<i>Corylus cornuta</i> Marsh.	Beaked Hazelnut	1,3
<i>Ostrya virginiana</i> (Mill.) K. Koch	Hop Hornbeam; Ironwood	1

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>FAGACEAE</u>	<u>BEECH FAMILY</u>	
<i>Fagus grandifolia</i> Ehrh.	Beech	1
<i>Quercus alba</i> L.	White Oak	3
<i>Quercus macrocarpa</i> Michx.	Bur Oak	1,2,3
<i>Quercus rubra</i> L.	Red Oak	1,4
<u>ULMACEAE</u>	<u>ELM FAMILY</u>	
<i>Ulmus americana</i> L.	White Elm	1,3
<i>Ulmus thomasi</i> Sarg.	Rock Elm	1
<u>URTICACEAE</u>	<u>NETTLE FAMILY</u>	
<i>Boehmeria cylindrica</i> (L.) Sw.	False Nettle	1,3
<i>Laportea canadensis</i> (L.) Wedd.	Wood Nettle	1
<i>Pilea pumila</i> (L.) Gray	Richweed, Clearweed	1,3,6
<i>Urtica dioica</i> L.	American Stinging Nettle	1,5,6
<i>subsp. gracilis</i> (Ait.)		
<u>SANTALACEAE</u>	<u>SANDALWOOD FAMILY</u>	
<i>Commandra umbellata</i> (L.) Nutt.	Bastard Toadflax	4,5
<u>ARISTOLOCHIACEAE</u>	<u>BIRTHWORT FAMILY</u>	
<i>Asarum canadense</i> L.	Wild Ginger	1
<u>POLYGONACEAE</u>	<u>BUCKWHEAT FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Polygonum amphibium</i> L.	Water Smartweed	6,7
<i>Polygonum ciliuode</i> Michx.	Fringed Buckwheat	
<i>Polygonum convolvulus</i> L.	Black Buckweed *	3,5
<i>Polygonum douglasii</i> Greene	Douglas's Knotweed	3
<i>Polygonum hydropiper</i> L.	Marshpepper Smartweed	3,6,7
<i>Polygonum lapathifolium</i> L.	Willow-weed	6
<i>Polygonum pensylvanicum</i> L.	Pinkweed; Bigseed Smartweed	5,7
<i>Polygonum persicaria</i> L.	Lady's Thumb *	5,6
<i>Polygonum sagittatum</i> L.	Arrow-leaved Smartweed	3,6
<i>Polygonum scandens</i> L.	Climbing False Buckwheat	5
<i>Rumex acetosella</i> L.	Sheep Sorrel *	3,4,6
<i>Rumex crispus</i> L.	Curly Dock *	5,6
<i>Rumex obtusifolius</i> L.	Bitter Dock *	5
<i>Rumex orbiculatus</i> Gray	Great Water Dock	1,6
<u>CHENOPODIACEAE</u>	<u>SPINACH FAMILY</u>	
<i>Chenopodium album</i> L.	Lamb's-quarters; Pigweed *	5
<i>Chenopodium hybridum</i> L.	Maple-leaved Goosefoot	5
var. <i>gigantospermum</i> (Aellen) Rouleau		
<u>AMARANTHACEAE</u>	<u>AMARANTH FAMILY</u>	
<i>Amaranthus retroflexus</i> L.	Redroot Pigweed *	5
<u>PORTULACACEAE</u>	<u>PURSLANE FAMILY</u>	
<i>Claytonia caroliniana</i> Michx.	Carolina Spring Beauty	1
<i>Claytonia virginica</i> L.	Narrow-leaved Spring Beauty	1

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Portulaca oleracea</i> L.	Purslane *	5
<u>CARYOPHYLLACEAE</u>	<u>PINK FAMILY</u>	
<i>Cerastium fontanum</i> Baumg.	Mouse-eared Chickweed *	5
<i>Dianthus armeria</i> L.	Deptford Pink *	1,5
<i>Silene antirrhina</i> L.	Sleepy Catchfly *	5
<i>Silene gallica</i> L.	Catchfly *	5
<i>Silene vulgaris</i> (Moench) Garcke	Bladder Campion *	5
<i>Stellaria longifolia</i> Willd.	Chickweed; Long-leaved Starwort	5
<u>NYMPHAEACEAE</u>	<u>WATER-LILY FAMILY</u>	
<i>Nuphar variegata</i> Durand	Bullhead Lily	7
<i>Nymphaea odorata</i> Ait.	Fragrant Water-lily	7
<u>CERATOPHYLLACEAE</u>	<u>HORNWORT FAMILY</u>	
<i>Ceratophyllum demersum</i> L.	Common Coontail	7
<u>RANUNCULACEAE</u>	<u>BUTTERCUP FAMILY</u>	
<i>Actaea rubra</i> (Ait.) Willd.	Red Baneberry	1
<i>Anemone canadensis</i> L.	Canada Anemone	1,3,5
<i>Anemone virginiana</i> L.	Thimbleweed	3
<i>Aquilegia canadensis</i> L.	Wild Columbine	1,3
<i>Caltha palustris</i> L.	Marsh-marigold	3,6
<i>Clematis virginiana</i> L.	Virgin's-bower	1,3
<i>Coptis trifolia</i> (L.) Salisb.	Gold Thread	1
<i>Hepatica acutiloba</i> DC.	Sharp-lobed Hepatica	1

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Fern.</i>		
<i>Ranunculus abortivus L.</i>	Small-flowered Buttercup	1
<i>Ranunculus acris L.</i>	Tall Buttercup	1,3,5
<i>Ranunculus hispidus Michx.</i>	Swamp Buttercup	1
<i>Ranunculus longirostris L.</i>	White Water-crowfoot	7
<i>Ranunculus recurvatus Poir.</i>	Hooked Buttercup	1
<i>Ranunculus sceleratus L.</i>	Cursed Crowfoot	3
<i>Thalictrum dioicum L.</i>	Early Meadow Rue	1
<i>Thalictrum pubescens Pursh</i>	Tall Meadow Rue	1,3,6
<u>BERBERIDACEAE</u>	<u>BARBERRY FAMILY</u>	
<i>Caulophyllum thalictroides</i> (L.) Michx.	Blue Cohosh	1
<u>PAPAVERACEAE</u>	<u>POPPY FAMILY</u>	
<i>Sanguinaria canadensis L.</i>	Bloodroot	1
<u>FUMARIACEAE</u>	<u>FUMITORY FAMILY</u>	
<i>Corydalis sempervirens (L.) Pers.</i>	Pink Corydalis	3,4
<i>Dicentra cucullaria (L.) Bernh.</i>	Dutchman's-breeches	1
<u>BRASSICACEAE</u>	<u>MUSTARD FAMILY</u>	
<i>Armoracia aquatica (Eat.) Wieg.</i>	Lake Cress	7
<i>Barbarea vulgaris R. Br.</i>	Yellow Rocket *	5
<i>Cardamine bulbosa (Muhl.) BSP.</i>	Spring Cress	1
<i>Dentaria diphylla Michx.</i>	Toothwort	1

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Dentaria laciniata</i> Muhl.	Cutleaf Toothwort	1
<i>Erysimum cheiranthoides</i> L.	Wormseed Mustard *	3,5
<i>Lepidium campestre</i> (L.) R. Br.	Field Pepper-grass *	5
<i>Nasturtium microphyllum</i> (Boenn.) Reichenb.	Water Cress *	1
<i>Rorippa palustris</i> (L.) Besser	Marsh Yellow Cress	6,7
<u>DROSERACEAE</u>	<u>SUNDEW FAMILY</u>	
<i>Drosera rotundifolia</i> L.	Round-leaved Sundew	1
<u>CRASSULACEAE</u>	<u>ORPINE FAMILY</u>	
<i>Penthorum sedoides</i> L.	Ditch Stonecrop	5
<i>Sedum acre</i> L.	Mossy Stonecrop *	4
<i>Sedum telephium</i> L.	Live-forever *	4
<u>SAXIFRAGACEAE</u>	<u>SAXIFRAGE FAMILY</u>	
<i>Chrysosplenium americanum</i> Hooker	Golden Saxifrage	1
<i>Mitella diphylla</i> L.	Bishop's Cap	1
<i>Mitella nuda</i> L.	Naked Mitrewort	1
<i>Parnassia glauca</i> Raf.	Grass-of-parnassus	6
<i>Saxifraga virginensis</i> Michx.	Early Saxifrage	3,4
<i>Tiarella cordifolia</i> L.	Foam Flower	1
<u>GROSSULARIACEAE</u>	<u>GOOSEBERRY FAMILY</u>	
<i>Ribes americanum</i> Mill.	Wild Black Currant	1

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Ribes cynosbati</i> L.	Prickly Gooseberry	1
<i>Ribes glandulosum</i> Grauer	Skunk Currant	1
<i>Ribes lacustre</i> (Pers.) Poir.	Swamp Black Current	1,3
<i>Ribes rubrum</i> L.	Red Currant	1
<i>Ribes triste</i> Pall.	Swamp Red Currant	1
<u>ROSACEAE</u>	<u>ROSE FAMILY</u>	
<i>Agrimonia gryposepala</i> Wallr.	Agrimony	1
<i>Agrimonia pubescens</i> Wallr.	Hairy Agrimony	1,3
<i>Amelanchierspicata</i> (Lam.) K. Kochx.	Serviceberry	1,3,4
<i>Crataegus</i> sp.	Hawthorn sp.	1,2,3,5
<i>Dalibarda repens</i> L.	Dewdrop	
<i>Fragaria vesca</i> L.	Woodland Strawberry	1
<i>Fragaria virginiana</i> Dcne.	Common Strawberry	1,3,5,6
<i>Geum aleppicum</i> Jacq.	Yellow Avens	1,3,5
<i>Geum canadense</i> Jacq.	White Avens	1,3
<i>Geum rivale</i> L.	Purple Avens	1,3,6
<i>Malus domestica</i> Borkh.	Apple *	3,5
<i>Potentilla anserina</i> L.	Silverweed	4,5
<i>Potentilla argentea</i> L.	Silvery Cinquefoil	5
<i>Potentilla fruticosa</i> L.	Shrubby Cinquefoil	6
<i>Potentilla norvegica</i> L.	Rough Cinquefoil	3,4,5
<i>Potentilla palustris</i> (L.) Scop.	Marsh Cinquefoil	6
<i>Potentilla recta</i> L.	Rough-fruited Cinquefoil	3,5
<i>Prunus nigra</i> Ait.	Canada Plum	1
<i>Prunus pensylvanica</i> L. f.	Pin Cherry'	1,4
<i>Prunus pumila</i> L.	Sand cherry	1
<i>Prunus serotina</i> Ehrh.	Black Cherry	3
<i>Prunus virginiana</i> L.	Chokecherry	1,2,3

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Rosa acicularis</i> Lindl.	Bristly Wild rose	4
<i>Rosa blanda</i> Ait.	Smooth Rose	3
<i>Rubus allegheniensis</i> Porter	Common Blackberry	1
<i>Rubus canadensis</i> L.	Smooth Blackberry	1
<i>Rubus hispidus</i> L.	Swamp Dewberry	1
<i>Rubus pubescens</i> Raf.	Dwarf Raspberry	1,3,4
<i>Rubus setosus</i> Bigel.	Bristly Blackberry	1
<i>Rubus strigosus</i> Michx.	Wild Red Raspberry	1,3,5
<i>Sorbus aucuparia</i> L.	European Mountain-ash *	1
<i>Spiraea alba</i> DuRoi	Meadow-sweet	1,3,6
<i>Spiraea tomentosa</i> L.	Steeplebush	6
<u>FABACEAE</u>	<u>PEA FAMILY</u>	
<i>Amphicarpaea bracteata</i> (L.) Fern.	Hog-peanut	1
<i>Desmodium glutinosum</i> (Muhl.) Wood	Tick-trefoil	1
<i>Lathyrus palustris</i> L.	Marsh Pea	3,6
<i>Lotus corniculatus</i> L.	Bird-foot Trefoil	5
<i>Medicago lupulina</i> L.	Black Medic *	5
<i>Medicago sativa</i> L.	Alfalfa *	3,5
<i>Melilotus alba</i> Medic.	White Sweet-clover *	5
<i>Trifolium aureum</i> Poll.	Hop Clover *	5
<i>Trifolium hybridum</i> L.	Alsike Clover *	5
<i>Trifolium pratense</i> L.	Red Clover *	5
<i>Vicia cracca</i> L.	Bird Vetch *	1,3,5
<i>Vicia sativa</i> L.	Common Vetch *	5
<i>Vicia tetraperna</i> (L.) Schreb.	Sparrow Vetch *	1
<u>GERANIACEAE</u>	<u>GERANIUM FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Geranium bicknellii</i> Britton	Bicknell's Geranium	3
<i>Geranium carolinianum</i>	Carolina Cranesbill	4
<i>Geranium robertianum</i> L.	Herb Robert *	1,3
<u>OXALIDACEAE</u>	<u>WOOD-SORREL FAMILY</u>	
<i>Oxalis stricta</i> L.	Common Wood-sorrel	3,5
<u>POLYGALACEAE</u>	<u>MILKWORT FAMILY</u>	
<i>Polygala paucifolia</i> Willd.	Fringed Polygala	1
<u>CALLITRICHACEAE</u>	<u>WATER-STARWORT FAMILY</u>	
<i>Callitriche verna</i> L.	Water-starwort	7
<u>LIMNANTHACEAE</u>	<u>FALSE MERMAID FAMILY</u>	
<i>Floerkea proserpinacoides</i> Willd.	False Mermaid	1
<u>ANACARDIACEAE</u>	<u>CASHEW FAMILY</u>	
<i>Rhus radicans</i> L.	Poison-ivy	1,3,4,5
<i>Rhus typhina</i> L.	Staghorn Sumac	1,3,4,5
<u>CELASTRACEAE</u>	<u>STAFF-TREE FAMILY</u>	
<i>Celastrus scandens</i> L.	Climbing Bittersweet	1,5
<u>ACERACEAE</u>	<u>MAPLE FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Acer negundo</i> L.	Manitoba Maple *	3,5
<i>Acer rubrum</i> L.	Red Maple	1,3,4
<i>Acer saccharinum</i> L.	Silver Maple	1
<i>Acer saccharum</i> Marsh.	Sugar Maple	1,3
<i>Acer spicatum</i> L.	Mountain Maple	1
<u>BALSAMINACEAE</u>	<u>TOUCH-ME-NOT-FAMILY</u>	
<i>Impatiens capensis</i> Meerb.	Spotted Jewelweed, Touch-me-not	1,6
<u>RHAMNACEAE</u>	<u>BUCKTHORN FAMILY</u>	
<i>Rhamnus alnifolia</i> L'Herr	Alder-leaved Buckthorn	1,6
<i>Rhamnus frangula</i> L.	Glossy-buckthorn *	1
<u>VITACEAE</u>	<u>GRAPE FAMILY</u>	
<i>Parthenocissus inserta</i> (A. Kerner) Fritsch	Virginia Creeper	1,3,4
<i>Vitis riparia</i> Michx.	Riverbank Grape	1,3,5
<u>TILIACEAE</u>	<u>LINDEN FAMILY</u>	
<i>Tilia americana</i> L.	Basswood	1,3
<u>HYPERICACEAE</u>	<u>ST. JOHN'S-WORT FAMILY</u>	
<i>Hypericum perforatum</i> L.	Common St. John's-wort *	5
<i>Triadenum fraseri</i> (Spach) Gl.	Marsh St. John's-wort	3

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>VIOLACEAE</u>	<u>VIOLET FAMILY</u>	
<i>Viola conspersa</i> Reich.	Dog Violet	1,4
<i>Viola cucullata</i> Ait.	Marsh Violet	1
<i>Viola incognita</i> Brain.	White Violet	1
<i>Viola pallens</i> (Banks) Brain.	Smooth White Violet	1
<i>Viola pubescens</i> Ait.	Downy Yellow Violet	1
<i>Viola renifolia</i> Gray	Kidney-leaved Violet	1
<i>Viola sororia</i> Willd.	Common Blue Violet	1,3,4
<u>THYMELAEACEAE</u>	<u>MEZEREUM FAMILY</u>	
<i>Dirca palustris</i> L.	Leatherwood	1
<u>ELAEAGNACEAE</u>	<u>OLEASTER FAMILY</u>	
<i>Shepherdia canadensis</i> (L.) Nutt.	Soapberry, Buffaloberry	4
<u>LYTHRACEAE</u>	<u>LOOSESTRIFE FAMILY</u>	
<i>Decodon verticillatus</i> (L.) Ell.	Water Willow	6
<i>Lythrum salicaria</i> L.	Purple Loosestrife	5,6
<u>ONAGRACEAE</u>	<u>EVENING-PRIMROSE FAMILY</u>	
<i>Circaea alpina</i> L.	Small Enchanter's Nightshade	1
<i>Circaea lutetiana</i> L.	Enchanter's Nightshade	1
<i>Epilobium angustifolium</i> L.	Fireweed	5,6
<i>Epilobium ciliatum</i> Raf.	Stick Willowherb	6

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Epilobium hirsutum</i> L.	Hairy Willowherb *	6
<i>Epilobium leptophyllum</i> Raf.	Willowherb	
<i>Ludwigia palustris</i> (L.) Ell.	False Loosestrife	3,6
<i>Oenothera biennis</i> L.	Hairy Yellow Evening-primrose	3,4,6
<i>Oenothera parviflora</i> L.	Small-flowerer Evening-primrose	
<i>Oenothera perennis</i> L.	Meadow Sundrops	
<u>HALORAGACEAE</u>	<u>WATER MILFOIL FAMILY</u>	
<i>Myriophyllum exalbescens</i> Fern.	Northern Water-milfoil	7
<i>Myriophyllum spicatum</i> L.	Eurasian Water-milfoil	7
<u>ARALIACEAE</u>	<u>GINSENG FAMILY</u>	
<i>Aralia nudicaulis</i> L.	Wild Sarsaparilla	1
<u>APIACEAE</u>	<u>CARROT FAMILY</u>	
<i>Cicuta bulbifera</i> L.	Bulbous Water-hemlock	3,6,7
<i>Cicuta maculata</i> L.	Spotted Water-hemlock	1,6
<i>Cryptotaenia canadensis</i> (L.) DC.	Honewort	1
<i>Daucus carota</i> L.	Wild Carrot, Queen Anne's Lace *	5
<i>Hydrocotyle americana</i> L.	Marsh Pennywort	3
<i>Osmorhiza longistylis</i> (Torr.) DC.	Anise root	1
<i>Sanicula gregaria</i> Bickn.	Black Snakeroot	1
<i>Sanicula marilandica</i> L.	Black Snakeroot	1,5
<i>Sium suave</i> Walt.	Water-parsnip	1,3,6,7
<u>CORNACEAE</u>	<u>DOGWOOD FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Cornus alternifolia</i> L.f.	Alternate-leaved Dogwood	1
<i>Cornus canadensis</i> L.	Bunchberry	1
<i>Cornus rugosa</i> Lam.	Round-leaved Dogwood	1
<i>Cornus stolonifera</i> Michx.	Red-osier Dogwood	1,2,3,5,6
<u>PYROLACEAE</u>	<u>WINTERGREEN FAMILY</u>	
<i>Orthilia secunda</i> (L.) House	One-sided Pyrola or Wintergreen	1
<i>Pyrola asarifolia</i> Michx.	Pink Pyrola, Wintergreen	1
<i>Pyrola elliptica</i> Nutt.	Shinleaf	1
<u>ERICACEAE</u>	<u>HEATH FAMILY</u>	
<i>Gaultheria hispidula</i>	Creeping Strawberry	1
<i>Gaultheria procumbens</i> L.	Checkerberry, Wintergreen	1
<i>Gaylussacia baccata</i> (Wang.) K. Koch	Black Huckleberry	1,4
<i>Vaccinium angustifolium</i> Ait.	Lowbush Blueberry	4
<i>Vaccinium oxycoccus</i> L.	Small Cranberry	6
<i>Vaccinium myrtilloides</i> Michx.	Velvet-leaved Blueberry	4
<u>PRIMULACEAE</u>	<u>PRIMROSE FAMILY</u>	
<i>Lysimachia ciliata</i> L.	Fringed Loosestrife	1,3,5
<i>Lysimachia quadriflora</i> Sims.	Prairie Loosestrife	6
<i>Lysimachia terrestris</i> (L.) BSP.	Swamp Loosestrife or Candles	3,6
<i>Lysimachia thyrsiflora</i> L.	Tufted Loosestrife	1,3,6
<i>Trientalis borealis</i> Raf.	Star-flower	1
<u>OLEACEAE</u>	<u>OLIVE FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Fraxinus americana</i> L.	White Ash	1
<i>Fraxinus nigra</i> Marsh.	Black Ash.	1,3
<i>Fraxinus pennsylvanica</i> Marsh.	Red Ash	1,2,3,5
<u>GENTIANACEAE</u>	<u>GENTIAN FAMILY</u>	
<i>Gentiana andrewsii</i> Griseb.	Closed Gentian	5
<i>Menyanthes trifoliata</i> L.	Bog Buckbean	3,6
<u>APOCYNACEAE</u>	<u>DOGBANE FAMILY</u>	
<i>Apocynum androsaemifolium</i> L.	Spreading Dogbane	1,4,5
<u>ASCLEPIADACEAE</u>	<u>MILKWEED FAMILY</u>	
<i>Asclepias incarnata</i> L.	Swamp Milkweed	3,6
<i>Asclepias syriaca</i> L.	Common Milkweed	1,3,5
<u>CONVOLVULACEAE</u>	<u>MORNING GLORY FAMILY</u>	
<i>Calystegia sepium</i> (L.) R.Br.	Hedge Bindweed, Wild Morning Glory	3,6
<i>Convolvulus arvensis</i> L.	Field Bindweed *	1,3,5
<u>POLEMONIACEAE</u>	<u>PHLOX FAMILY</u>	
<i>Phlox divaricata</i> L.	Blue Phlox	1
<u>HYDROPHYLLACEAE</u>	<u>WATERLEAF FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Hydrophyllum virginianum</i> L.	Virginia Waterleaf	1
<u>BORAGINACEAE</u>	<u>BORAGE FAMILY</u>	
<i>Cynoglossum officinale</i> L.	Hound's-tongue *	1
<i>Echium vulgare</i> L.	Blueweed, Viper's-bugloss *	5
<i>Myosotis scorpioides</i> L.	True Forget-me-not *	6
<u>VERBENACEAE</u>	<u>VERVAIN FAMILY</u>	
<i>Verbena hastata</i> L.	Blue Vervain	3,4,5,6
<i>Verbena urticifolia</i> L.	White Vervain	1
<u>LAMIACEAE</u>	<u>MINT FAMILY</u>	
<i>Galeopsis tetrahit</i> L.	Hemp-nettle *	5
<i>Glechoma hederacea</i> L.	Ground-ivy *	1,5
<i>Leonurus cardiaca</i> L.	Motherwort *	1,3
<i>Lycopus americanus</i> Muhl.	American Water-horehound	3,6
<i>Lycopus uniflorus</i> Michx.	Water-horehound	1,3,6
<i>Mentha arvensis</i> L.	Field or Common Mint	1,5,6
<i>Mentha X piperita</i> L. (pro. sp.)	Peppermint *	1
<i>Monarda fistulosa</i> L.	Wild Bergamot	4
<i>Nepeta cataria</i> L.	Catnip *	5
<i>Prunella vulgaris</i> L.	Heal-all	1,5,6
<i>Satureja vulgaris</i> (L.) Fritsch	Wild Basil	3,5
<i>Scutellaria galericulata</i> L.	Common Skullcap	3,6
<i>Scutellaria lateriflora</i> L.	Mad-dog Skullcap	6
<u>SOLANACEAE</u>	<u>NIGHTSHADE FAMILY</u>	

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Solanum dulcamara</i> L.	Bitterweet Nightshade *	1,6
<i>Solanum ptycanthum</i> DC.	Black Nightshade	1
<u>SCROPHULARIACEAE</u>	<u>FIGWORT FAMILY</u>	
<i>Chaenorrhinum minus</i> (L.) Lange	Dwarf Snapdragon *	5
<i>Chelone glabra</i> L.	Turtlehead	1,3,6
<i>Linaria vulgaris</i> Mill.	Toadflax, Butter-and-egg *	5
<i>Mimulus ringens</i> L.	Square-stemmed Monkeyflower	5
<i>Pedicularis canadensis</i> L.	Wood-betony, Common Lousewort	3
<i>Verbascum thapsus</i> L.	Common Mullein *	4,5
<i>Vernonica americana</i> (Raf.) Schwein.	American Brookline	1
<i>Veronica officinalis</i> L.	Common Speedwell *	3
<u>OROBANCHACEAE</u>	<u>BROOM-RAPE FAMILY</u>	
<i>Conopholis americana</i> (L.) Wallr.	Squawroot	1
<i>Orobanche uniflora</i> L.	Cancer-root	5
<u>LENTIBULARIACEAE</u>	<u>BLADDERWORT FAMILY</u>	
<i>Utricularia intermedia</i> Hayne	Flat-leaved Bladderwort	7
<i>Utricularia vulgaris</i> L.	Common Bladderwort	7
<u>PLANTAGINACEAE</u>	<u>PLANTAIN FAMILY</u>	
<i>Plantago lanceolata</i> L.	English Plantain *	3,5
<i>Plantago major</i> L.	Broad-leaved Plantain *	3,5

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>RUBIACEAE</u>	<u>MADDER FAMILY</u>	
<i>Galium aparine</i> L.	Cleavers	3
<i>Galium asprellum</i> Michx.	Rough Bedstraw	1,3
<i>Galium circaezans</i> Michx.	Wild Licorice	1
<i>Galium labradoricum</i> (Weig.) Weig	Bedstraw	6
<i>Galium obtusum</i> Bigel.	Bedstraw	1,3
<i>Galium palustre</i> L.	Marsh Bedstraw	1,3
<i>Galium trifidum</i> L.	Bedstraw	3,6,7
<i>Galium triflorum</i> Michx.	Sweet-scented Bedstraw	1
<i>Mitchella repens</i> L.	Partridge-berry	1
<u>CAPRIFOLIACEAE</u>	<u>HONEYSUCKLE FAMILY</u>	
<i>Diervilla lonicera</i> Mill.	Bush-honeysuckle	1,4
<i>Linnaea borealis</i> L.	Twinflower	1
<i>Lonicera canadensis</i> Marsh.	Fly-honeysuckle	1
<i>Lonicera dioica</i> L.	Wild Honeysuckle	1,3
<i>Lonicera oblongifolia</i>	Swamp Fly Honeysuckle	6
<i>Lonicera tatarica</i> L.	Tartarian Honeysuckle	1
<i>Sambucus canadensis</i> L.	Common Elder	3,6
<i>Sambucus pubens</i> Michx.	Red-berried Elder	1,3
<i>Triosteum aurantiacum</i> Bickn.	Wild Coffee	1
<i>Viburnum cassinoides</i> L.	Wild-raisin	1
<i>Viburnum lentago</i> L.	Nannyberry	1,2,3
<i>Viburnum rafinesquianum</i> Schultes	Downy Arrow-wood	1,3
<i>Viburnum trilobum</i> Marsh.	Highbush-cranberry	1,3

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<u>CUCURBITACEAE</u>	<u>GOURD FAMILY</u>	
<i>Echinocystis lobata</i> (Michx.) T. & G.	Wild Cucumber	1
<u>CAMPANULACEAE</u>	<u>BLUEBELL OR HAREBELL FAMILY</u>	
<i>Campanula rotundifolia</i> L.	Harebell	4
<i>Campanula uliginosa</i> Rydb.	Blue Marsh Bellflower	6
<i>Triodanis perfoliata</i> (L.) Nieawl.	Venus Looking Glass	4
<u>LOBELIACEAE</u>	<u>LOBELIA FAMILY</u>	
<i>Lobelia kalmii</i> L.	Kalm's Lobelia	6
<u>ASTERACEAE</u>	<u>ASTER FAMILY</u>	
<i>Achillea millefolium</i> L.	Yarrow	3,5
<i>Ambrosia artemisiifolia</i> L.	Common Ragweed	5
<i>Anaphalis margaritacea</i> (L.) Benth.	Pearly Everlasting	4
<i>Arctium minus</i> (Hill) Bernh.	Common Burdock	3,5
<i>Aster borealis</i> (T. & G.)Prov.	Bog Aster	6
<i>Aster ciliolatus</i> Lindl.	Aster	1
<i>Aster cordifolius</i> L.	Heart-leaved Aster	5
<i>Aster lanceolatus</i> Willd.	Tall White Aster	1,3,5,6
<i>Aster lateriflorus</i> (L.) Britt.	One-sided Aster	1,3,5,6
<i>Aster macrophyllus</i> L.	Large-leaved Aster	1
<i>Aster puniceus</i> L.	Red-stemmed Aster	1,3,5,6
<i>Aster sagittifolius</i> Wedem.	Arrow-leaved Aster	5
<i>Aster umbellatus</i> Mill.	Flat-topped White Aster	1
<i>Bidens beckii</i> Torrey	Aquatic Beggarticks	7

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Bidens cernua</i> L.	Nodding Beggarticks	6,7
<i>Bidens frondosa</i> L.	Devil's Beggarticks	1
<i>Carduus acanthoides</i> L.	Scotch Thistle *	5
<i>Chrysanthemum leucanthemum</i> L.	Ox-eye Daisy *	3,5
<i>Cichorium intybus</i> L.	Chickory *	5
<i>Cirsium arvense</i> (L.) Scop.	Canada Thistle *	5,6
<i>Cirsium muticum</i> Michx.	Swamp Thistle	1
<i>Cirsium vulgare</i> (Savi) Tenore	Bull Thistle *	3,5
<i>Conyza canadensis</i> (L.) Cronq.	Horse-Weed	5
<i>Erigeron annuus</i> (L.) Pers.	White Fleabane	3,5
<i>Erigeron philadelphicus</i> L.	Philadelphia Fleabane	1,3,5
<i>Eupatorium maculatum</i> L.	Spotted Joe-Pye Weed	1,3,6
<i>Eupatorium perfoliatum</i> L.	Boneset	3,6
<i>Hieracium aurantiacum</i> L.	Orange Hawkweed *	3,4,5
<i>Hieracium pilosella</i> L.	Mouse-eared Hawkweed *	3,5
<i>Inula helenium</i> L.	Elecampane *	1,6
<i>Lactuca biennis</i> (Moench) Fern.	Tall Blue Lettuce	1
<i>Lactuca canadensis</i> L.	Canada Lettuce	1
<i>Prenanthes alba</i> L.	White Lettuce, Rattlesnakeroot	1
<i>Rudbeckia hirta</i> L.	Black-eyed Susan	5
<i>Senecio aureus</i> L.	Golden Ragwort	6
<i>Solidago caesia</i> L.	Blue-stem Goldenrod	1
<i>Solidago canadensis</i> L.	Canada Goldenrod	1,3,5,6
<i>Solidago gigantea</i> Ait.	Late Goldenrod	1,3
<i>Solidago graminifolia</i> (L.) Salisb.	Narrow-leaf Goldenrod	5,6
<i>Solidago juncea</i> Ait.	Early Goldenrod	4,5
<i>Solidago rugosa</i> Ait.	Rough Goldenrod	3,5
<i>Solidago uliginosa</i> Nutt.	Bog Goldenrod	6
<i>Sonchus arvensis</i> L.	Field Sow-thistle *	5
<i>Taraxacum officinale</i> Weber	Dandelion *	1,3,5

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

**APPENDIX B: LIST OF PLANT SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FAMILY SPECIES	COMMON NAME	VEGETATION COMMUNITY
<i>Tragopogon dubius Scop.</i> <i>Tussilago farfara L.</i>	Goat's-beard * Sweet Coltsfoot *	5 1,5

Vegetation Communities

- | | | |
|--------------|------------------|-------------|
| 1 - Forest | 4 - Barren Rock | 7 - Aquatic |
| 2 - Parkland | 5 - Open Upland | |
| 3 - shrub | 6 - Open Wetland | |

* Non Native Species

APPENDIX C

**LIST OF BIRDS RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

APPENDIX C: LIST OF BIRDS* RECORDED IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA

COMMON NAME	SCIENTIFIC NAME	SOURCE		PRE - 1967 ³	OTHER
		1982 STUDY	1989 ² STUDY		
Common Loon	<i>Gavia immer</i>	X	X		
Pied-billed Grebe	<i>Podilymbus podiceps</i>	B	B	B	
Horned Grebe	<i>Podiceps auritus</i>		X		X ⁴
American White Pelican	<i>Pelecanus erythrorhynchos</i>			X	X ⁵
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	X	X	X	
American Bittern	<i>Botaurus lentiginosus</i>	X	B	B	
Least Bittern	<i>Ixobrychus exilis</i>	B	B	B	
Great Blue Heron	<i>Ardea herodias</i>	X	X		
Green-backed Heron	<i>Butorides striatus</i>	X	X		
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>		X		
Tundra Swan	<i>Cygnus columbianus</i>		X	X	X ⁶
Snow Goose	<i>Chen caerulescens</i>				X ⁶
Brant	<i>Branta bernicla</i>			X	
Canada Goose	<i>Branta canadensis</i>	B	B	X	
Wood Duck	<i>Aix sponsa</i>	B	B	B	B ^{7,10}
Green-winged Teal	<i>Anas crecca</i>	X	B		X ⁸
American Black Duck	<i>Anas rubripes</i>	X	B		X ⁸
Mallard	<i>Anas platyrhynchos</i>	B	B	B	B ^{7,8,9}
Northern Pintail	<i>Anas acuta</i>		X		X ⁴
Blue-winged Teal	<i>Anas discors</i>	B	B	B	B ^{7,8,9}
Northern Shoveler	<i>Anas clypeata</i>		X	X	
Gadwall	<i>Anas strepera</i>		X	X	
American Wigeon	<i>Anas americana</i>		X	X	
Canvasback	<i>Aythya valisineria</i>		X		X ⁴
Redhead	<i>Aythya americana</i>		X	X	X ⁶
Ring-necked Duck	<i>Aythya collaris</i>		X	X	X ⁴
Greater Scaup	<i>Aythya marila</i>		X		X ⁴
Lesser Scaup	<i>Aythya affinis</i>		X	B	X ⁴
Oldsquaw	<i>Clangula hyemalis</i>			X	
Surf Scoter	<i>Melanitta perspicillata</i>		X		
White-winged Scoter	<i>Melanitta fusca</i>				X ⁴
Common Goldeneye	<i>Bucephala clangula</i>	X	X		X ⁴
Bufflehead	<i>Bucephala albeola</i>		X	X	X ⁴
Hooded Merganser	<i>Lophodytes cucullatus</i>		X		X ⁴
Common Merganser	<i>Mergus merganser</i>	X	X		

* Nomenclature and taxonomy follow that of American Ornithologist's Union (1983).

Sources:

1 Observed in 1982 (Van Stam and McLachlin 1982a).

2 Observed in 1989 (GLL field data).

3 Devitt (1967).

4 Cited in Van Stam and McLachlin (1982a).

5 Zeidler (pers. comm., 1989).

6 Allison (pers. comm., 1989).

7 Rombach and Craig (1981).

8 Unpublished CWS data (1969).

9 Stirrett and Harris (1951).

10 Collins (1974).

11 Bowles (pers. comm., 1989).

12 Mills (1981).

X Observed

B Breeding Evidence

E Extinct

APPENDIX C: LIST OF BIRDS* RECORDED IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA

COMMON NAME	SCIENTIFIC NAME	SOURCE		PRE - 1967 ³	OTHER
		1982 STUDY	1989 ² STUDY		
Turkey Vulture	<i>Cathartes aura</i>	X	X		
Osprey	<i>Pandion haliaetus</i>	X	X		
Bald Eagle	<i>Haliaeetus leucocephalus</i>				X ¹¹
Northern Harrier	<i>Circus cyaneus</i>	X	B		
Sharp-shinned Hawk	<i>Accipiter striatus</i>	X			
Northern Goshawk	<i>Accipiter gentilis</i>				X ⁴
Red-shouldered Hawk	<i>Buteo lineatus</i>	X			
Broad-winged Hawk	<i>Buteo platypterus</i>	B	B	B	
Red-tailed Hawk	<i>Buteo jamaicensis</i>	B	B		
Rough-legged Hawk	<i>Buteo lagopus</i>		X		
American Kestrel	<i>Falco sparverius</i>	B	B		
Ruffed Grouse	<i>Bonasa umbellus</i>	B	B		
Virginia Rail	<i>Rallus limicola</i>	B	B		
Sora	<i>Porzana carolina</i>	B	B		
Common Moorhen	<i>Gallinula chloropus</i>	X	B	B	
American Coot	<i>Fulica americana</i>	X	B	B	X ⁸
Sandhill Crane	<i>Grus canadensis</i>		X		
Black-bellied Plover	<i>Pluvialis squatarola</i>		X		
Semipalmated Plover	<i>Charadrius semipalmatus</i>		X		
Killdeer	<i>Charadrius vociferus</i>	B	B		
Greater Yellowlegs	<i>Tringa melanoleuca</i>	X	X		
Lesser Yellowlegs	<i>Tringa flavipes</i>		X		
Solitary Sandpiper	<i>Tringa solitaria</i>		X		
Spotted Sandpiper	<i>Actitis macularia</i>	X	B		
Upland Sandpiper	<i>Bartramia longicauda</i>			B	B ⁴
Semipalmated Sandpiper	<i>Calidris pusilla</i>		X		
Least Sandpiper	<i>Calidris minutilla</i>	X			
Dunlin	<i>Calidris alpina</i>		X		
Ruff	<i>Philomachus pugnax</i>		X		
Common Snipe	<i>Gallinago gallinago</i>	X	B	B	
American Woodcock	<i>Scolopax minor</i>	X	B		
Bonaparte's Gull	<i>Larus philadelphia</i>		X		
Ring-billed Gull	<i>Larus delawarensis</i>	X	X		
Herring Gull	<i>Larus argentatus</i>	X	X		
Caspian Tern	<i>Sterna caspia</i>	X	X	X	

* Nomenclature and taxonomy follow that of American Ornithologist's Union (1983).

Sources:

1 Observed in 1982 (Van Stam and McLachlin 1982a).

2 Observed in 1989 (GLL field data).

3 Devitt (1967).

4 Cited in Van Stam and McLachlin (1982a).

5 Zeidler (pers. comm., 1989).

6 Allison (pers. comm., 1989).

7 Roenbach and Craig (1981).

8 Unpublished CWS data (1969).

9 Stirrett and Harris (1951).

10 Collins (1974).

11 Bowles (pers. comm., 1989).

12 Mills (1981).

X Observed

B Breeding Evidence

E Extinct

APPENDIX C: LIST OF BIRDS* RECORDED IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA

COMMON NAME	SCIENTIFIC NAME	SOURCE		PRE - 1967 ³	OTHER
		1982 STUDY	1989 ² STUDY		
Common Tern	<i>Sterna hirundo</i>	X	X		
Black Tern	<i>Chlidonias niger</i>	B	B	B	
Rock Dove	<i>Columba livia</i>	X	X		
Mourning Dove	<i>Zenaida macroura</i>	X	X		
Passenger Pigeon	<i>Ectopistes migratorius</i>			E	
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	X	B		
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	X	B		
Great Horned Owl	<i>Bubo virginianus</i>	X	X		
Snowy Owl	<i>Nyctea scandiaca</i>				X ⁴
Northern Hawk Owl	<i>Surnia ulula</i>			X	X ⁴
Short-eared Owl	<i>Asio flammeus</i>			X	X ⁴
Chimney Swift	<i>Chaetura pelagica</i>	X			
Ruby-throated Hummingbird	<i>Archilochus colubris</i>	X			
Belted Kingfisher	<i>Ceryle alcyon</i>	X	B		
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	X		X	
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	B	B		
Downy Woodpecker	<i>Picoides pubescens</i>	B	B		
Hairy Woodpecker	<i>Picoides villosus</i>	X	X		
Northern Flicker	<i>Colaptes auratus</i>	B	B		
Pileated Woodpecker	<i>Dryocopus pileatus</i>	X	X		
Olive-sided Flycatcher	<i>Contopus borealis</i>	X	X		
Eastern Wood-Pewee	<i>Contopus virens</i>	X	B		
Alder Flycatcher	<i>Empidonax alnorum</i>		B		
Willow Flycatcher	<i>Empidonax traillii</i>	B	B		
Least Flycatcher	<i>Empidonax minimus</i>	X	B		
Eastern Phoebe	<i>Sayornis phoebe</i>	B	B		
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	X	B		
Eastern Kingbird	<i>Tyrannus tyrannus</i>	B	B		
Purple Martin	<i>Progne subis</i>	X	X		
Tree Swallow	<i>Tachycineta bicolor</i>	B	B		
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	X	X		
Bank Swallow	<i>Riparia riparia</i>	X	X		
Cliff Swallow	<i>Hirundo pyrrhonota</i>	X	B		
Barn Swallow	<i>Hirundo rustica</i>	B	B		
Blue Jay	<i>Cyanocitta cristata</i>	B	B		

* Nomenclature and taxonomy follow that of American Ornithologist's Union (1983).

Sources:

1 Observed in 1982 (Van Stam and McLachlin 1982a).

2 Observed in 1989 (OLL field data).

3 Devitt (1967).

4 Cited in Van Stam and McLachlin (1982a).

5 Zeidler (pers. comm., 1989).

6 Allison (pers. comm., 1989).

7 Rombach and Craig (1981).

8 Unpublished CWS data (1969).

9 Stirrett and Harris (1951).

10 Collins (1974).

11 Bowles (pers. comm., 1989).

12 Mills (1981).

X Observed

B Breeding Evidence

E Extinct

APPENDIX C: LIST OF BIRDS* RECORDED IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA

COMMON NAME	SCIENTIFIC NAME	SOURCE		PRE - 1967 ³	OTHER
		1982 STUDY	1989 ² STUDY		
American Crow	<i>Corvus brachyrhynchos</i>	B	B		
Common Raven	<i>Corvus corax</i>				X ⁴
Black-capped Chickadee	<i>Parus atricapillus</i>	B	B		
Red-breasted Nuthatch	<i>Sitta canadensis</i>	B	B		
White-breasted Nuthatch	<i>Sitta carolinensis</i>	B	B		
Brown Creeper	<i>Certhia americana</i>	B			
House Wren	<i>Troglodytes aedon</i>	B	B		
Winter Wren	<i>Troglodytes troglodytes</i>	B	B		
Sedge Wren	<i>Cistothorus platensis</i>	B	B		
Marsh Wren	<i>Cistothorus palustris</i>	B	B	B	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	B			
Ruby-crowned Kinglet	<i>Regulus calendula</i>		B		
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	B	B		
Eastern Bluebird	<i>Sialia sialis</i>			X	
Veery	<i>Catharus fuscescens</i>	B	B		
Gray-cheeked Thrush	<i>Catharus minimus</i>		X		
Wood Thrush	<i>Hylocicla mustelina</i>	B	B		
American Robin	<i>Turdus migratorius</i>	B	B		
Gray Catbird	<i>Dumetella carolinensis</i>	B	B		
Brown Thrasher	<i>Toxostoma rufum</i>	B	B		
Bohemian Waxwing	<i>Bombycilla garrulus</i>			X	X ⁴
Cedar Waxwing	<i>Bombycilla cedrorum</i>	B	B		
Loggerhead Shrike	<i>Lanius ludovicianus</i>			X	B
European Starling	<i>Sturnus vulgaris</i>	B	B		
Yellow-throated Vireo	<i>Vireo flavifrons</i>	X	B		
Warbling Vireo	<i>Vireo gilvus</i>	B	B		
Red-eyed Vireo	<i>Vireo olivaceus</i>	B	B		
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	X	B		B ⁴
Nashville Warbler	<i>Vermivora ruficapilla</i>	B	B		
Yellow Warbler	<i>Dendroica petechia</i>	B	B		
Chestnut-sided Warbler	<i>Dendroica pensylvanica</i>	X	B		
Yellow-rumped Warbler	<i>Dendroica coronata</i>	X	X		
Blackburnian Warbler	<i>Dendroica fusca</i>	X	X		
Pine Warbler	<i>Dendroica pinus</i>		X		
Palm Warbler	<i>Dendroica palmarum</i>		X		

* Nomenclature and taxonomy follow that of American Ornithologist's Union (1983).

Sources:

1 Observed in 1982 (Van Stam and McLachlin 1982a).

2 Observed in 1989 (GLL field data).

3 Devitt (1967).

4 Cited in Van Stam and McLachlin (1982a).

5 Zeidler (pers. comm., 1989).

6 Alison (pers. comm., 1989).

7 Rombach and Craig (1981).

8 Unpublished CWS data (1969).

9 Stirrett and Harris (1951).

10 Collins (1974).

11 Bowles (pers. comm., 1989).

12 Mills (1981).

X Observed

B Breeding Evidence

E Extinct

APPENDIX C: LIST OF BIRDS* RECORDED IN MATCHEDASH BAY PROVINCIAL WILDLIFE AREA

COMMON NAME	SCIENTIFIC NAME	SOURCE		PRE - 1967 ³	OTHER
		1982 STUDY	1989 ² STUDY		
Black-and-white Warbler	<i>Mniotilta varia</i>	X	B		
American Redstart	<i>Setophaga ruticilla</i>	X	B		
Ovenbird	<i>Seiurus aurocapillus</i>		B		
Northern Waterthrush	<i>Seiurus noveboracensis</i>	X	B		
Mourning Warbler	<i>Oporornis philadelphia</i>	X	B		
Common Yellowthroat	<i>Geothlypis trichas</i>	B	B		
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	X	B		
Indigo Bunting	<i>Passerina cyanea</i>	X	B		
American Tree Sparrow	<i>Spizella arborea</i>		X		
Chipping Sparrow	<i>Spizella passerina</i>	X	B		
Field Sparrow	<i>Spizella pusilla</i>	X	B		
Vesper Sparrow	<i>Poocetes gramineus</i>	X			
Savannah Sparrow	<i>Passerculus sandwichensis</i>	B	B		
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	X			
Song Sparrow	<i>Melospiza melodia</i>	B	B		
Swamp Sparrow	<i>Melospiza georgiana</i>	B	B	B	
White-throated Sparrow	<i>Zonotrichia albicollis</i>	B	B		
Snow Bunting	<i>Plectrophenax nivalis</i>		X		
Bobolink	<i>Dolichonyx oryzivorus</i>	B	B		
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	B	B		
Eastern Meadowlark	<i>Sturnella magna</i>				
Rusty Blackbird	<i>Euphagus carolinus</i>		X		X ⁴
Common Grackle	<i>Quiscalus quiscula</i>	X	B		
Brown-headed Cowbird	<i>Molothrus ater</i>	B	B		
Orchard Oriole	<i>Icterus spurius</i>		B		B ¹²
Northern Oriole	<i>Icterus galbula</i>	B	B		
Purple Finch	<i>Carpodacus purpureus</i>		X		
American Goldfinch	<i>Carduelis tristis</i>	X	B		
House Sparrow	<i>Passer domesticus</i>	X	X		

* Nomenclature and taxonomy follow that of American Ornithologist's Union (1963).

Sources:

1 Observed in 1982 (Van Stam and McLachlin 1982a).

2 Observed in 1989 (OLL field data).

3 Devitt (1967).

4 Cited in Van Stam and McLachlin (1982a).

5 Zeidler (pers. comm., 1989).

6 Alison (pers. comm., 1989).

7 Rombach and Craig (1981).

8 Unpublished CWS data (1969).

9 Stirrett and Harris (1951).

10 Collins (1974).

11 Bowles (pers. comm., 1989).

12 Mills (1981).

X Observed

B Breeding Evidence

E Extinct

APPENDIX D

**LIST OF MAMMALS RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

**APPENDIX D: LIST OF MAMMALS* RECORDED IN MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA**

COMMON NAME	SCIENTIFIC NAME	SOURCE		
		1982 ¹ STUDY	1989 ² STUDY	OTHER
Masked Shrew	<i>Sorex cinereus</i>	X		
Smoky Shrew	<i>Sorex fumeus</i>	X		
Short-tailed Shrew	<i>Blarina brevicauda</i>		X	
Hairy-tailed Mole	<i>Parascalops breweri</i>	X		
Eastern Cottontail	<i>Sylvilagus floridanus</i>	X	X	
Snowshoe Hare	<i>Lepus americanus</i>	X	X	
Eastern Chipmunk	<i>Tamias striatus</i>	X	X	
Woodchuck	<i>Marmota monax</i>	X	X	
Grey Squirrel	<i>Sciurus carolinensis</i>	X	X	
American Red Squirrel	<i>Tamiasciurus hudsonicus</i>	X	X	X ³
American Beaver	<i>Castor canadensis</i>	X	X	X ³
Deer Mouse	<i>Peromyscus maniculatus</i>	X	X	
Muskrat	<i>Ondatra zibethicus</i>	X	X	X ^{3,4,5}
Meadow Vole	<i>Microtus pennsylvanicus</i>	X	X	
Woodland Jumping Mouse	<i>Napaeozapus insignis</i>	X		
American Porcupine	<i>Erethizon dorsatum</i>	X	X	
Coyote	<i>Canis latrans</i>			X ^{3,4}
Red Fox	<i>Vulpes vulpes</i>	X		X ^{3,4}
American Black Bear	<i>Ursus americanus</i>			X ³
Raccoon	<i>Procyon lotor</i>	X	X	X ^{3,4}
Fisher	<i>Martes pennanti</i>			X ⁴
Short-tailed Weasel	<i>Mustela erminea</i>	X		X ³
American Mink	<i>Mustela vison</i>	X	X	X ^{3,4}
Striped Skunk	<i>Mephitis mephitis</i>	X		X ³
River Otter	<i>Lontra canadensis</i>			X ^{3,4}
Lynx or Bobcat	<i>Lynx sp.</i>			X ⁴
White-tailed Deer	<i>Odocoileus virginianus</i>	X	X	X ³
Moose	<i>Alces alces</i>			X ^{3,4}

Sources:

1 Observed / trapped in 1982 (McLachlin and Van Stam 1982).

2 Observed in 1989 (GILL inventory data).

3 Observed / trapped prior to 1982 (McLachlin and Van Stam 1982).

4 Observed / trapped 1982 - 1989 (R. Cronin, pers. comm., 1989).

5 LaFrance (1979-1987)

* Nomenclature and taxonomy are in accordance with Banfield (1974.)

APPENDIX E

**LIST OF AMPHIBIANS AND REPTILES RECORDED IN
MATCHEDASH BAY PROVINCIAL WILDLIFE AREA, 1982 - 1989**

**APPENDIX E: LIST OF AMPHIBIANS AND REPTILES* RECORDED IN MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA, 1982-1989**

COMMON NAME	SCIENTIFIC NAME	YEAR		STATUS IN CENTRAL REGION OMNR **
		1982	1989	
Eastern Redback Salamander	<i>Plethodon cinereus</i>		X	Abundant and widespread
American Toad	<i>Bufo americanus</i>	X	X	Abundant and widespread
Striped Chorus Frog	<i>Pseudacris triseriata</i>		X	Abundant and widespread
Spring Peeper	<i>Hyla crucifer</i>		X	Abundant and widespread
Tetraploid Gray Treefrog	<i>Hyla versicolor</i>	X	X	Abundant and widespread
Bullfrog	<i>Rana catesbeiana</i>	X	X	Common and widespread
Green Frog	<i>Rana clamitans</i>	X	X	Abundant and widespread
Pickereel Frog	<i>Rana palustris</i>	X		Uncommon and widespread
Northern Leopard Frog	<i>Rana pipiens</i>	X	X	Abundant and widespread
Wood Frog	<i>Rana sylvatica</i>	X	X	Abundant and widespread
Common Snapping Turtle	<i>Chelydra serpentina</i>	X	X	Abundant and widespread
Blanding's Turtle	<i>Emydoidea blandingii</i>		X	Uncommon and widespread
Painted Turtle	<i>Chrysemys picta</i>	X	X	Abundant and widespread
Map Turtle	<i>Graptemys geographica</i>		X	Uncommon and widespread
Five-lined Skink	<i>Eumeces fasciatus</i>		X	Rare and local
Milk Snake	<i>Lampropeltis triangulum</i>	X	X	Uncommon and widespread
Common Garter Snake	<i>Thamnophis sirtalis</i>	X	X	Abundant and widespread
Brown Snake	<i>Storeria dekayi</i>	X	X	Common and widespread

* Taxonomy and scientific names are in accordance with those of
Collins et al. (1982). Common names follow Cook (1984).

** Source : Plourde et al. (1989).

APPENDIX F

**LIST OF BUTTERFLIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA, APRIL - SEPTEMBER 1989**

**APPENDIX F: LIST OF BUTTERFLIES * RECORDED IN MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA, APRIL - SEPTEMBER, 1989**

COMMON NAME	SCIENTIFIC NAME
SKIPPER FAMILY	HESPERIIDAE
Silver-spotted Skipper	<i>Epargyreus clarus</i>
Dreamy Duskywing	<i>Erynnis icelus</i>
Juvenal's Duskywing	<i>Erynnis juvenalis</i>
Arctic Skipper	<i>Carterocephalus palaemon</i>
Least Skipper	<i>Ancyloxypha numitor</i>
European Skipper	<i>Thymelicus lineola</i>
Leonard's Skipper	<i>Hesperia leonardus</i>
Tawny-edged Skipper	<i>Polites themistocles</i>
Long Dash	<i>Polites mystic</i>
Hobomok Skipper	<i>Poanes hobomok</i>
Dun Skipper	<i>Euphyes ruricola</i>
SWALLOWTAIL FAMILY	PAPILIONIDAE
Eastern Black Swallowtail	<i>Papilio polyxenes</i>
Tiger Swallowtail	<i>Pterourus glaucus</i>
SULPHUR AND WHITE FAMILY	PIERIDAE
Mustard White	<i>Artogeia napi</i>
Cabbage White	<i>Artogeia rapae</i>
Common Sulphur	<i>Colias philodice</i>
HAIRSTREAK FAMILY	LYCAENIDAE
Acadian Hairstreak	<i>Satyrium acadica</i>
Banded Hairstreak	<i>Satyrium calanus</i>
Striped Hairstreak	<i>Satyrium liparops</i>
Eastern Tailed Blue	<i>Everes comyntas</i>
Spring Azure	<i>Celastrina ladon</i>

* Taxonomy and scientific names are in accordance with those of Miller and Brown (1981). Common names have been taken from Gregory (1983).

**APPENDIX F (cont): LIST OF BUTTERFLIES * RECORDED IN MATCHEDASH
BAY PROVINCIAL WILDLIFE AREA, APRIL - SEPTEMBER, 1989**

COMMON NAME	SCIENTIFIC NAME
BRUSHFOOT FAMILY	<i>NYMPHALIDAE</i>
Great Spangled Fritillary	<i>Speyeria cybele</i>
Silver-bordered Fritillary	<i>Clossiana selene</i>
Meadow Fritillary	<i>Clossiana bellona</i>
Pearl Crescent	<i>Phyciodes tharos</i>
Baltimore	<i>Euphydryas phaeton</i>
Question Mark	<i>Polygonia interrogationis</i>
Comma	<i>Polygonia comma</i>
Gray Comma	<i>Polygonia progne</i>
Compton Tortoiseshell	<i>Nymphalis vau-album</i>
Mourning Cloak	<i>Nymphalis antiopa</i>
Milbert's Tortoiseshell	<i>Nymphalis milberti</i>
Red Admiral	<i>Vanessa atalanta</i>
Banded Purple	<i>Basilarchia arthemis</i>
Viceroy	<i>Basilarchia archippus</i>
SATYR FAMILY	<i>SATYRIDAE</i>
Pearly Eye	<i>Enodia anthedon</i>
Eyed Brown	<i>Satyroides eurydice</i>
Little Wood Satyr	<i>Megisto cymela</i>
Inornate Ringlet	<i>Coenonympha inornata</i>
Large Wood Nymph	<i>Cercyonis pegala</i>
MILKWEED BUTTERFLY FAMILY	<i>DANAIDAE</i>
Monarch	<i>Danaus plexippus</i>

* Taxonomy and scientific names are in accordance with those of Miller and Brown (1981). Common names have been taken from Gregory (1983).

APPENDIX G

**LIST OF FISH SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

**APPENDIX G : LIST OF FISH SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FISH SPECIES	NORTH RIVER	COLDWATER RIVER	CATFISH BAY	NORTH BAY	WEST BAY	NORTH SHORE	SOUTH SHORE
Longnose gar <i>Lepisosteus osseus</i>	x	x	x	x		x	x
Bowfin <i>Amia calva</i>	x	x	x	x	x		
Gizzard shad <i>Dorosoma cepedianum</i>	x	x			x	x	
Pink salmon <i>Oncorhynchus gorbuscha</i>		x					
Coho salmon <i>Oncorhynchus kisutch</i>		x					
Chinook salmon <i>Oncorhynchus tshawytscha</i>		x			x		
Rainbow trout <i>Oncorhynchus mykiss</i>		x					
Brown trout <i>Salmo trutta</i>		x					
Brook trout <i>Salvelinus fontinalis</i>	x	x					
Northern pike <i>Esox lucius</i>	x	x		x	x		
Muskellunge <i>Esox masquinongy</i>	x					x	
Mudminnow <i>Umbra limi</i>					x		
Common white sucker <i>Catostomus commersoni</i>	x	x	x	x	x		
Silver Redhorse <i>Moxostoma anisurum</i>	x						
Finescale dace <i>Phoxinus neogaeus</i>			x				
Carp <i>Cyprinus carpio</i>	x	x	x	x	x	x	x
Golden shiner <i>Notemigonus crysoleucas</i>	x		x	x	x	x	
Emerald shiner <i>Notropis atherinoides</i>					x	x	

Note: Sampling areas are shown on Figure 11.

1 Van Stam and McLachlin (1982c)

2 Borecky and Edmunds (1978)

3 Goodyear et. al. (1982) (collection location listed only as "Matchedash Bay"; results included under "North shore" column)

4 Observations by GLL, (1989)

5 Ecocern Limited (1987)

**APPENDIX G (cont) : LIST OF FISH SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FISH SPECIES	NORTH RIVER	COLDWATER RIVER	CATFISH BAY	NORTH BAY	WEST BAY	NORTH SHORE	SOUTH SHORE
Common shiner <i>Notropis cornutus</i>	x						
Spottail shiner <i>Notropis hudsonius</i>			x	x	x		
Rosyface shiner <i>Notropis rubellus</i>	x	x					
Mimic shiner <i>Notropis volucellus</i>	x	x					
Bluntnose minnow <i>Pimephales notatus</i>	x	x					
Brown bullhead <i>Ictalurus nebulosus</i>	x	x	x	x	x	x	x
Channel catfish <i>Ictalurus punctatus</i>	x						x
Banded killifish <i>Fundulus diaphanus</i>			x	x			
Brook stickleback <i>Culaea inconstans</i>					x		
White bass <i>Morone chrysops</i>	x					x	
Rock bass <i>Ambloplites rupestris</i>	x	x	x	x	x		x
Pumpkinseed <i>Lepomis gibbosus</i>	x	x	x	x	x	x	x
Smallmouth bass <i>Micropterus dolomieu</i>	x	x					
Largemouth bass <i>Micropterus salmoides</i>	x	x	x	x	x	x	x
Black crappie <i>Pomoxis nigromaculatus</i>	x	x	x	x	x	x	x
Yellow perch <i>Perca flavescens</i>	x	x	x	x	x	x	x
Walleye <i>Stizostedion vitreum vitreum</i>	x	x					

Note: Sampling areas are shown on Figure 11.

1 Van Stam and McLachlin (1982c)

2 Borecky and Edmunds (1978)

3 Goodyear et. al. (1982) (collection location listed only as "Matchedash Bay"; results included under "North shore" column)

4 Observations by GLL, (1989)

5 Ecocern Limited (1987)

**APPENDIX G (cont) : LIST OF FISH SPECIES RECORDED IN MATCHEDASH BAY
PROVINCIAL WILDLIFE AREA**

FISH SPECIES	NORTH RIVER	COLDWATER RIVER	CATFISH BAY	NORTH BAY	WEST BAY	NORTH SHORE	SOUTH SHORE
Iowa darter <i>Etheostoma exile</i>				x	x		
Johnny darter <i>Etheostoma nigrum</i>			x	x	x		x
Logperch <i>Percina caprodes</i>	x	x	x		x	x	x
Brook Silverside <i>Labidesthes sicculus</i>					x		
Number of samples	observed, reported ^{1,3,4,5}	observed, reported ^{1,3,4,5}	4 seine ^{1,2} 4 trap	3 seine ¹ 7 trap	7 seine ^{1,2} 15 trap reported ⁵	5 seine ² reported ³ observed	7 seine ² observed

Note: Sampling areas are shown on Figure 11.

¹ Van Stam and McLachlin (1982c)

² Borecky and Edmunds (1978)

³ Goodyear et. al. (1982) (collection location listed only as "Matchedash Bay"; results included under "North shore" column)

⁴ Observations by GLL, (1989)

⁵ Ecocern Limited (1987)

APPENDIX H

MATCHEDASH BAY WATER QUALITY DATA, MAY - SEPT. 1989

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Soccal Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments
SW 1	04-May-89	0.0	10.6	10.6	4.0	0.75								
		0.5	10.2	11.3										
		1.0	9.9	11.8										
		1.5	10.0	11.5										
		2.0	10.0	11.6										
		2.5	9.9	12.0										
01-Jun-89	0.0	19.3	7.6	3.0	0.43					345		8.6	17.0	-cloudy, cool and windy -rippled water surface -rained May 3 1989 -100% cloud cover -water colour yellow brown -Carp jumping in water
	0.5	19.0	7.8											
	1.0	18.6	7.2											
	1.5	18.3	7.1						0.50	368		8.7	18.0	-raining mist, light breeze -rippled water surface -100% cloud cover -water colour yellow brown
	2.0	18.3	7.4											
		2.5	17.7	7.2										
20-Jun-89	0.0	19.0	7.8	2.8	0.63									
	0.5	18.9	7.6											
	1.0	17.9	6.8											
	1.5	17.4	6.6											
	2.0	17.2	6.4											
04-Jul-89	0.0	25.6	8.6	2.3	0.58					780		7.5	27.0	-sunny, slightly hazy, slight breeze -slight rippled water surface -0% cloud cover -water colour yellow/brown
	0.5	24.7	7.8											
	1.0	23.0	6.9											
	1.5	20.5	7.2											
20-Jul-89	0.0	21.9	7.8	2.7	0.73			0.019	2.07	485		9.0	27.0	-windy and sunny -rippled water surface -40% cloud cover -water colour clear to yellow brown -some carp in area
	0.5	21.9	7.7											
	1.0	21.1	7.7											
	1.5	19.8	7.7											
	2.0	18.8	7.8											
01-Aug-89	0.0	23.8	9.0	2.8	0.85					526		9.3	28.0	-breezy, warm sunny -rippled water surface -40% thin cloud cover -water colour clear -fishing boat in the area
	0.5	23.0	8.2											
	1.0	21.6	8.1											
	1.5	19.7	8.4											
	2.0	18.8	8.0											
17-Aug-89	0.0	21.3	8.5	2.8	0.75			0.050	4.53	510		9.3	19.0	-slight cool breeze from the north -rippled water surface -10% cloud cover -water colour clear/ slightly yellow-brown
	0.5	21.4	8.1											
	1.0	20.8	8.3											
	1.5	18.8	6.8											
	2.0	17.1	8.9											
28-Aug-89	0.0	19.2	8.4	2.5	0.90					380		8.3		-overcast and warm -water surface calm -100% cloud cover -water colour clear
	0.5	18.7	8.6											
	1.0	16.2	9.1											
	1.5	15.1	9.6											
	2.0	14.5	9.4											

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Socchi Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments		
	15-Sep-89	0.0	14.9	8.6	8.6	2.5	0.75	0.140	1.41	320		8.2	13.0	-sunny -water surface smooth -10% cloud cover -water colour clear -ten fishing boats at SW1 -one 20 pound salmon		
		0.5	14.9	8.6											-cold and windy	
		1.0	12.8	9.5											-water surface choppy -80% cloud cover -water colour brown	
		1.5	11.8	10.1												
		2.0	11.8	10.1												
	26-Sep-89	0.0	10.5	10.4	10.4	2.7	0.55			340		8.4	12.0			
		0.5	10.5	10.2												
		1.0	10.5	9.9												
		1.5	10.5	10.1												
		2.0	10.5	10.0												
		2.5	10.5	10.0												
		MAXIMUM														
		MEAN														
		MINIMUM														
		COUNT														
SW-2	04-May-89	0.0	13.2	12.4		0.8	0.60	0.140	4.53	780,000	9,300		28.0			
		0.5	12.0	11.3					0.070	2.13	450,444	8,589		20.1		
	01-Jun-89							0.019	0.50	320,000	7,500		12.0			
		0.0	19.0	8.0	8.0	2.6	0.38								-cloudy, cool, windy -rained last night -water surface rippled -100% cloud cover -water colour yellow/brown	
		0.5	19.0	7.7												
		1.0	19.0	7.6												
		1.5	18.9	7.4												
	20-Jun-89	2.0	18.9	7.3												
		0.0	18.9	8.6	8.6	1.7	0.58			3.48	363		6.7	18.5	-cloudy, windy, slight drizzle -more windy than SW1 -water surface rippled -100% cloud cover -water colour clear, yellow/brown	
		0.5	18.9	8.2												
		1.0	18.9	8.1												
	04-Jul-89	0.0	24.2	6.3	6.3	1.2	0.48			758		7.0	26.0	-sunny, hot, not as hazy as SW3&SW5 -great blue heron in cattails -water surface rippled -0% cloud cover -water colour clear, yellow/brown		
		0.5	24.1	6.6												

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Secchi Disc (m)	Turbidity FTU	Total Phosphorus µg/L	Chlorophyll a mg/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments	
20-Jul-89		0.0	22.5	7.9	2.0	0.58		0.013	2.37	468		8.7	24.0	-windy, sunny with thin cloud cover	
		0.5	22.4	7.5										-one fishing boat in area	
		1.0	22.4	7.6										-water surface rippled	
		1.5	22.4	7.7										-35% cloud cover	
01-Aug-89		0.0	23.3	9.0	1.0	0.70				480		9.4	24.0	-water colour clear, yellow/brown	
		0.5	23.1	7.8										-breezy, warm, sunny	
17-Aug-89														-lots of birds in sedges	
														-water surface rippled	
														-60% thin cloud cover	
														-water colour clear	
17-Aug-89		0.0	20.0	9.4	1.3	1.10		0.050	3.57	440		9.1	17.5	-cool north breeze, sunny	
		0.5	19.9	9.5										-water surface rippled	
														-10% cloud cover	
														-water colour clear	
28-Aug-89		0.0	19.1	10.2	2.2	0.80				370		8.2	22.0	-water surface calm	
		0.5	19.1	9.8										-water colour fairly clear, green tinge	
		1.0	18.9	9.6											
		1.5	18.0	9.2											
15-Sep-89		2.0	17.8	9.0											
15-Sep-89		0.0	15.3	9.2	1.2	0.70		0.170	3.37	320		8.3	13.0	-sunny	
		0.5	15.3	8.9										-water surface smooth	
		1.0	15.2	8.9										-10% cloud cover	
														-water colour clear	
26-Sep-89		0.0	11.5	10.1	2.5	2.50								-water surface rough	
		0.5	11.5	9.8											
		1.0	11.6	9.7											
		1.5	11.6	9.7											
26-Sep-89		2.0	11.6	9.7											
MAXIMUM									0.170	3.57	758,000		9.400	26.0	
MEAN									0.078	3.30	444,250		8.250	20.4	
MINIMUM									0.013	2.37	320,000		6.700	13.0	
COUNT									3	4	8	0	8	8	

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Secchi Disc (m)	Turbidity PTU	Total Phosphorus mg/L	Chlorophyll a mg/m ³	Conductivity Field umhos/cm	Conductivity @ 25 C umhos/cm	pH	Air Temperature °C	Comments
SW-3	04-May-89	0.0	11.8	12.2	1.4	1.35								-more windy than SW2
		0.5	11.8	11.9										-thick aquatic submerged plants
		1.0	11.7	11.8										-water surface rough -90% cloud cover -water colour yellow/brown
	01-Jun-89	0.0	19.6	9.6	1.4	0.73				325		8.9	17.0	
		0.5	19.6	9.4										-windy, brightening-up
		1.0	19.5	8.9										-water surface rough -100% cloud cover -water colour yellow/brown, clear
	20-Jun-89	0.0	19.0	11.0	1.5	0.73			11.64	347		9.2	19.5	
		0.5	19.7	10.7										-bary, hot, sunny
		1.0	19.7	9.9										-water surface calm -0% cloud cover -water surface clear, yellow/brown
	04-Jul-89	0.0	24.7	9.8	1.5	1.10				717		7.5	26.0	
		0.5	24.6	9.7										
		1.0	24.6	9.5										
	20-Jul-89	0.0	22.6	9.2	1.5	1.10		0.006	4.64	417		8.9	20.0	
		0.5	22.7	9.1										-sunny with thin cloud cover -Easterly wind
		1.0	22.6	9.1										-four fishing boats in area, thick weeds -water surface rough -90% cloud cover -water surface clear, yellow/brown
	01-Aug-89	0.0	23.8	9.4	1.4	1.40				416		9.3	25.0	
		0.5	23.6	9.0										-breezy, warm, sunny -thick weeds @ approx. 1.5m below surface
		1.0	23.3	9.5										-water surface rippled -15% cloud cover -water colour clear
	17-Aug-89	0.0	19.7	10.1	1.5	1.18		0.050	3.88	415		9.2	18.0	
		0.5	19.7	10.1										-cool breeze from the north, sunny -two fishing boats in area
		1.0	19.7	10.1										-water surface rough -10% cloud cover -water colour clear

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Secchi Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a ng/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments
	28-Aug-89	0.0 0.5 1.0	20.1 20.1 20.0	10.9 10.5 11.0	1.3	1.30				300		8.6		-warm, sunny -water surface choppy -10% cloud cover -water colour clear
	15-Sep-89	0.0 0.5 1.0	16.4 16.4 16.2	12.2 11.6 11.3	1.2	1.20		0.180	3.53	330		8.4	14.0	
	MAXIMUM							0.180	11.64	717,000		9.300	26.0	
	MEAN							0.079	5.92	408,375		8.750	19.9	
	MINIMUM							0.006	3.53	300,000		7.500	14.0	
	COUNT							3	4	8	0	8	7	
SW-4	04-May-89	0.0 0.5	13.2 13.2	12.1 11.8	0.9	0.90								-windy, cool -clear water with lots of vegetation -water surface rough -85 % cloud cover -water colour clear,yellow/brown
	01-Jun-89	0.0 0.5	20.0 20.0	9.9 9.8	1.0	1.00				255		9.0	16.0	-windy, humid -thick submerged vegetation -water surface rippled -97 % cloud cover -water colour clear,yellow/brown
	20-Jun-89	0.0 0.5	21.0 21.1	9.0 8.5	0.6	0.60			3.88	254			19.0	
	04-Jul-89	0.0 0.5	28.6 28.1	9.9 9.3	0.7	0.70				464		8.0	29.0	-sunny,hazy slight breeze -large amount of submerged vegetation -water surface calm -0% cloud cover -water colour clear,yellow/brown
	20-Jul-89	0.0 0.5	24.4 24.4	9.6 9.6	1.0	1.00		0.006	0.20	282		10.1	21.0	-windy, sparse clouds,sunny -birds in sedges, carp -water surface rippled -60 % cloud cover -water colour clear

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

[illegible]

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Secchi Disc (m)	Turbidity FTU	Total Phosphorus µg/L	Chlorophyll a mg/m3	Conductivity Field µmhos/cm	Conductivity @ 25 C µmhos/cm	pH	Air Temperature °C	Comments	
	04-Jul-89	0.0	24.9	8.7	1.7	1.70				643		7.5	24.0	-hazy, hot, slight breeze -water surface calm -0% cloud cover -water colour clear, yellow/brown	
		0.5	24.8	8.8											
		1.0	24.8	8.6											
	20-Jul-89	0.0	23.0	8.8	1.5	1.50		0.005	0.20	362		8.4	22.0	-cloudy, windy, cool -two fishing boats nearby -90% cloud cover -water surface rough -water colour clear, yellow/brown	
		0.5	23.0	8.7											
		1.0	23.0	8.7											
	01-Aug-89	0.0	23.6	9.0	1.6	1.60				310		9.7	27.0	-slight breeze, warm, sunny -weeds growing to surface -5% cloud cover -water surface rippled -water colour clear	
		0.5	23.5	9.2											
		1.0	23.5	9.0											
	17-Aug-89	0.0	20.3	8.8	1.9	1.90		0.040	1.10	329		9.0	18.0	-cool breeze from the north -sunny, cool temperature -water surface rough -5% cloud cover -water colour clear	
		0.5	20.3	8.6											
		1.0	20.3	8.6											
	28-Aug-89	0.0	20.3	11.5	1.2	1.20				250		8.9		-100% thin cloud cover	
		0.5	20.2	11.1											
		1.0	20.2	10.9											
	15-Sep-89	0.0	17.2	9.3	1.2	1.20		0.140	1.26	275		8.4	14.0	-sunny -water surface choppy -5% cloud cover -water colour clear	
		0.5	17.2	8.9											
		1.0	17.2	8.7											
MAXIMUM															
MEAN															
MINIMUM															
COUNT															
									0.140	2.52	643.000	9.700	27.0		
									0.062	1.27	342.125	8.686	20.0		
									0.005	0.20	250.000	7.500	14.0		
									3	4	8	0	7	7	

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

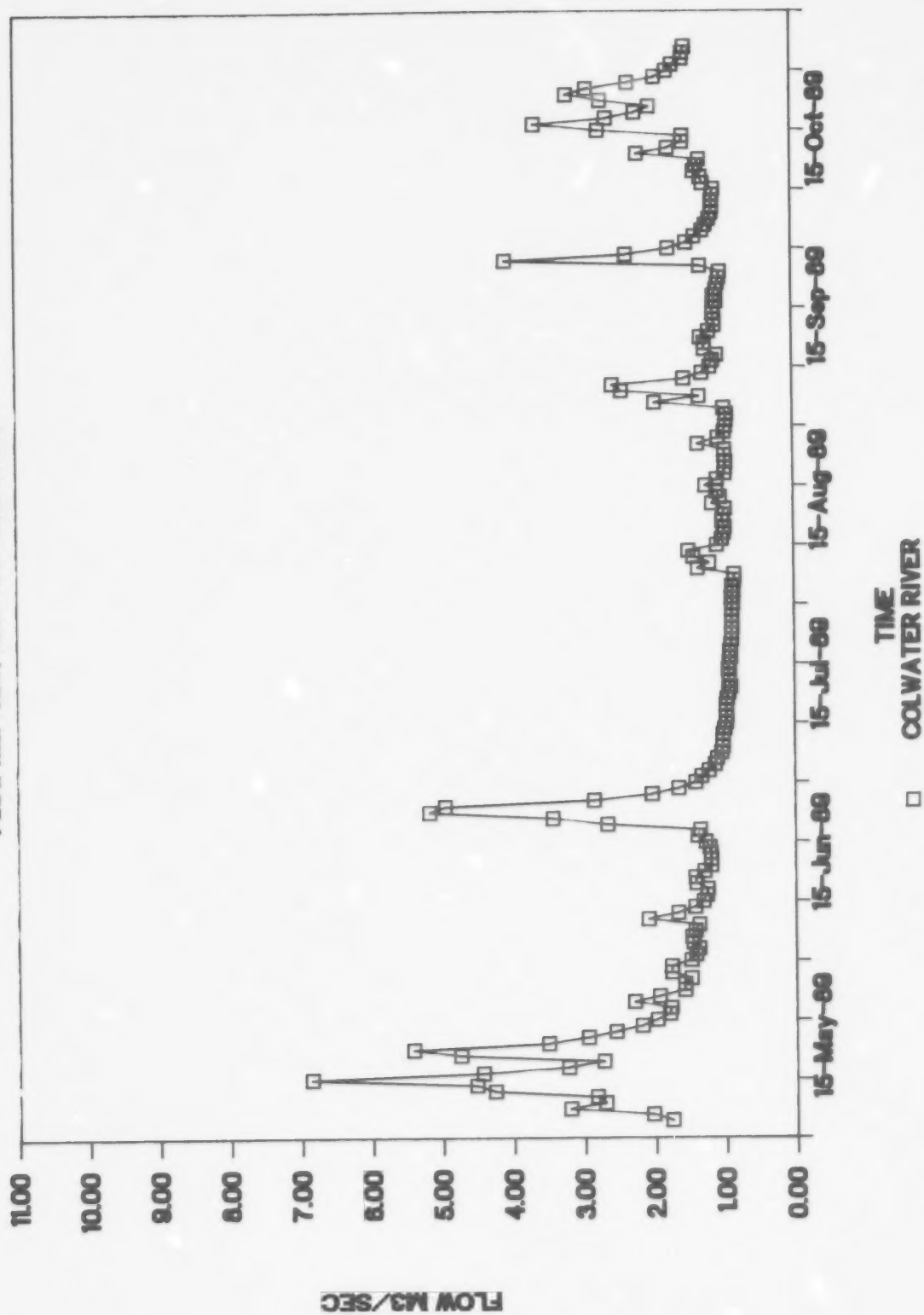
Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Socchi Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments
SW-6	17-Aug-89	0.0	25.4	9.1	0.3	0.25		0.060	2.72	549		9.4	27.2	-breezy, warm, sunny -nesting birds in area -water surface calm -40% thin cloud cover -water colour clear
MAXIMUM								0.060	2.72	549.000		9.400	27.2	
MEAN								0.060	2.72	549.000		9.400	27.2	
MINIMUM								0.060	2.72	549.000		9.400	27.2	
COUNT								1	1	1	0	1	1	
SW-7	01-Aug-89	0.0	25.1	12.6	0.3	0.30				464		9.8	27.2	-breezy, warm, sunny -lean aquatic veg. than earlier in the year -water surface calm -40% thin cloud cover -water colour clear
	17-Aug-89	0.0	21.8	10.0	0.3	0.25		0.050	3.78	474		9.2	20.0	-cool breeze from the north -small carp seen (y.o.y.) -water surface rippled -10% cloud cover -water colour clear
	28-Aug-89	0.0 0.5	20.0 19.8	9.0 9.0	0.8	0.55				350		8.2		-80% cloud cover -water colour clear -water surface calm
	15-Sep-89	0.0 0.5	15.6 15.5	12.0 11.5	0.7	0.70		0.140	1.61	320		8.3	14.0	-sunny -water surface smooth -10% cloud cover -water colour clear

Appendix H: Matchedash Bay Water Quality Data, May - Sept. 1989

Station Number	Sample Date	Depth (m)	Temperature °C	Dissolved oxygen mg/L	Maximum Depth (m)	Socchi Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umhos/cm	Conductivity @ 25 C umhos/cm	pH	Air Temperature °C	Comments
	26-Sep-89	0.0	11.6	10.0	0.5	0.50				350		8.4	11.0	-cold, windy -water surface choppy -95% cloud cover -water colour brown
	MAXIMUM							0.140	3.78	474 000	9 800		27.2	
	MEAN							0.095	2.70	391 600	8 780		18.1	
	MINIMUM							0.050	1.61	320 000	8 200		11.0	
	COUNT							2	2	5	0	5	4	
SW-8	17-Aug-89	0.0	22.0	8.4	2.8	0.63				551		9.1	20.8	-north wind, sunny -water surface rough -10% cloud cover -water colour clear
	0.5	22.1	8.6											
	1.0	21.9	8.6											
	1.5	21.5	7.7											
	2.0	21.1	6.3											
	19.7	7.4												
	18.7	7.4												
	18.0	7.8												
	16.6	8.3												
	16.0	8.3												
	28-Aug-89	0.0	19.7	7.4	2.6	0.65				400		8.2	22.0	-overcast -10% cloud cover
	0.5	18.7	7.4											
	1.0	18.0	7.8											
	1.5	16.6	8.3											
	2.0	16.0	8.3											
	16.1	8.5												
	15.8	8.3												
	15.5	8.0												
	15.4	7.5												
	15.2	7.2												
	15-Sep-89	0.0	16.1	8.5	2.6	0.55		0.140	1.66	360		7.5	15.0	-sunny -water surface calm -5% cloud cover -water colour clear
	0.5	15.8	8.3											
	1.0	15.5	8.0											
	1.5	15.4	7.5											
	2.0	15.2	7.2											
	16.1	8.5												
	15.8	8.3												
	15.5	8.0												
	15.4	7.5												
	15.2	7.2												
	26-Sep-89	0.0	11.4	10.2	2.8	0.55				320		8.3	12.0	-cold, windy -water surface choppy -80% cloud cover -water colour brown
	0.5	11.4	9.8											
	1.0	11.4	9.8											
	1.5	11.4	9.8											
	2.0	11.4	10.0											
	2.5	11.3	9.8											
	MAXIMUM							0.140	1.66	551 000	9 100		22.0	
	MEAN							0.070	1.66	407 750	8 275		17.5	
	MINIMUM							0.000	1.66	320 000	7 500		12.0	
	COUNT							2	1	4	0	4	4	

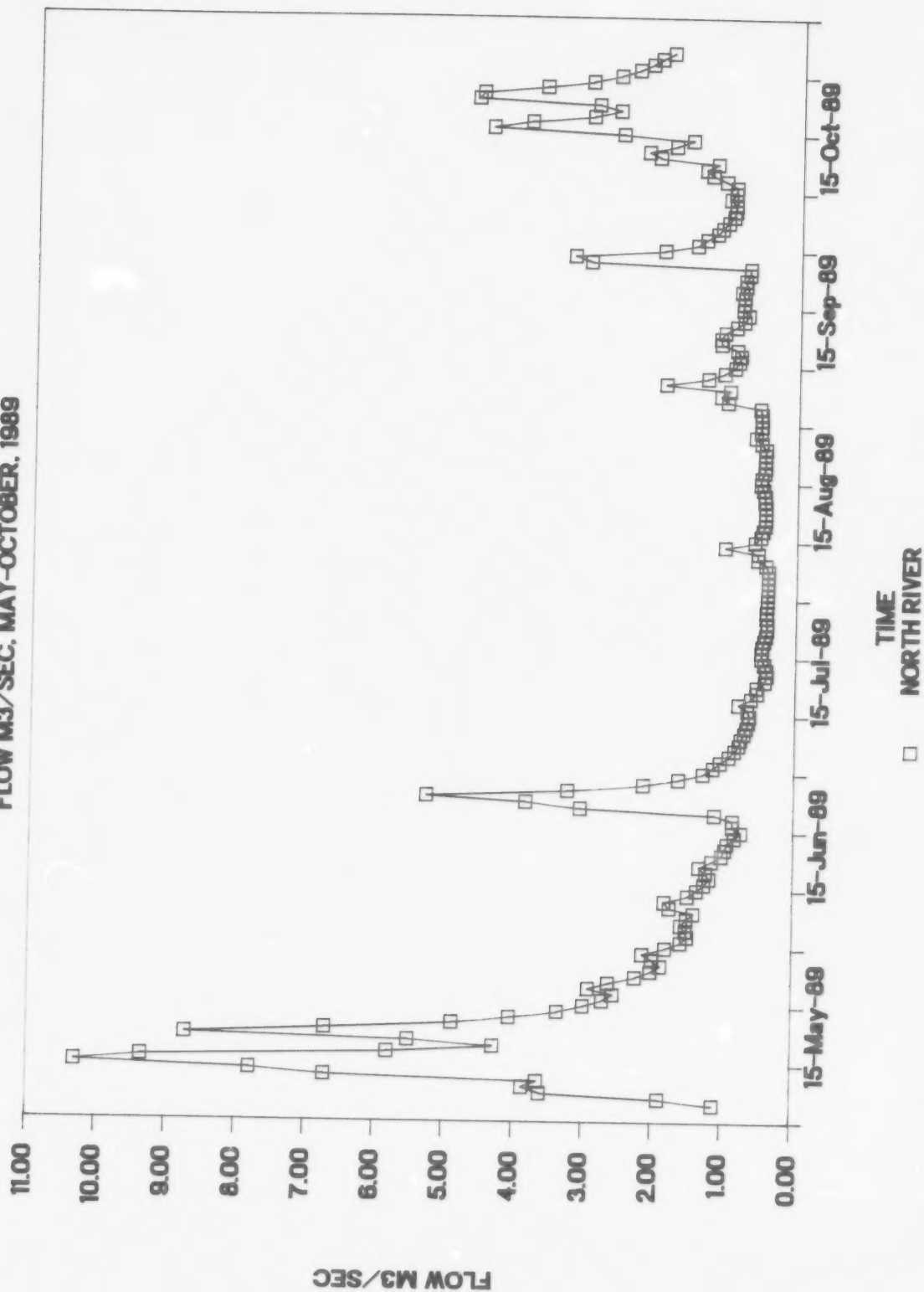
COLDWATER RIVER

FLOW M3/SEC. MAY-OCTOBER, 1968



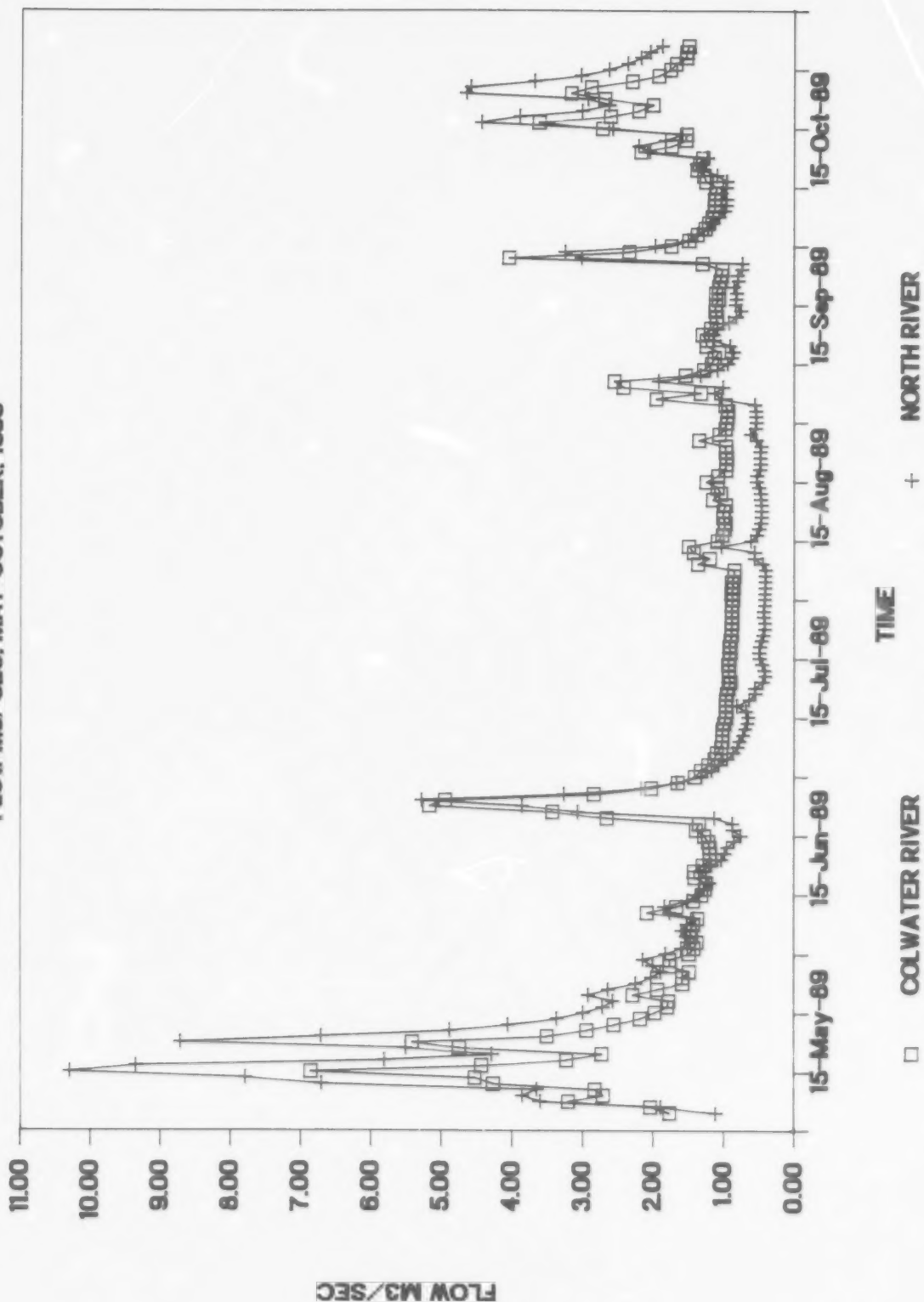
NORTH RIVER

FLOW M3/SEC, MAY-OCTOBER, 1989



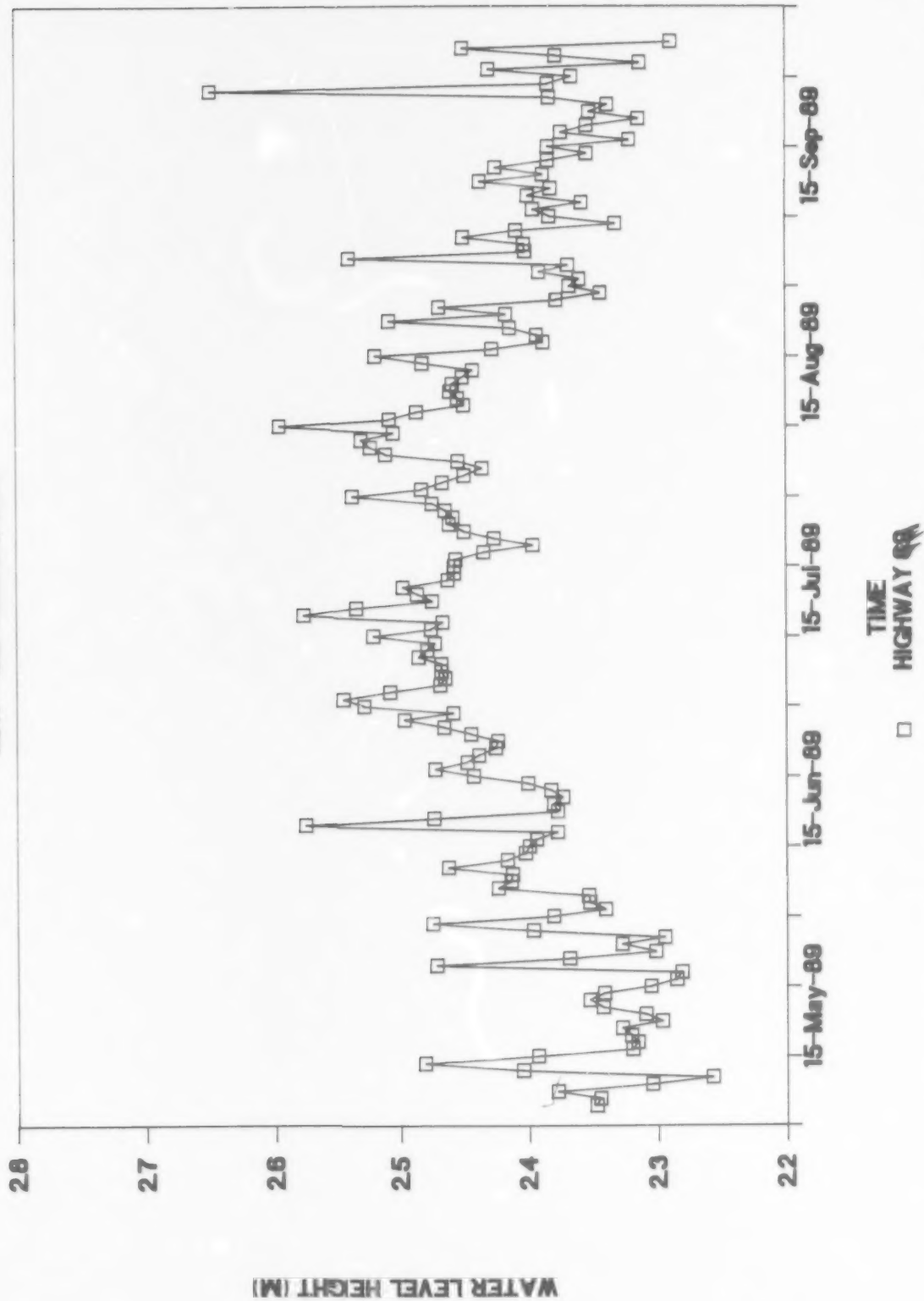
COLDWATER RIVER AND NORTH RIVER

FLOW M3/SEC, MAY-OCTOBER, 1989



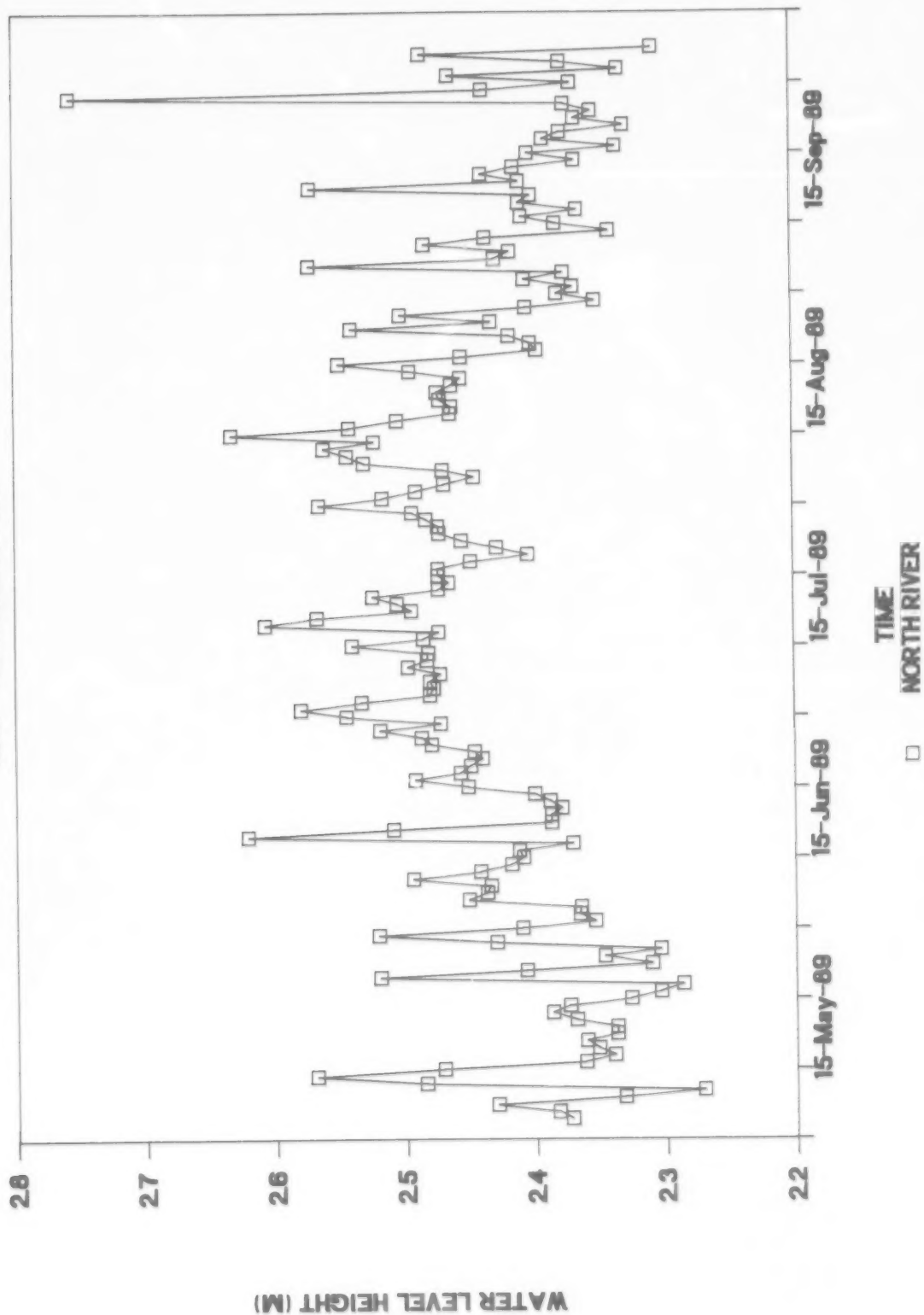
WATER LEVELS, MATCHEDASH BAY

MAY - SEPTEMBER, 1989



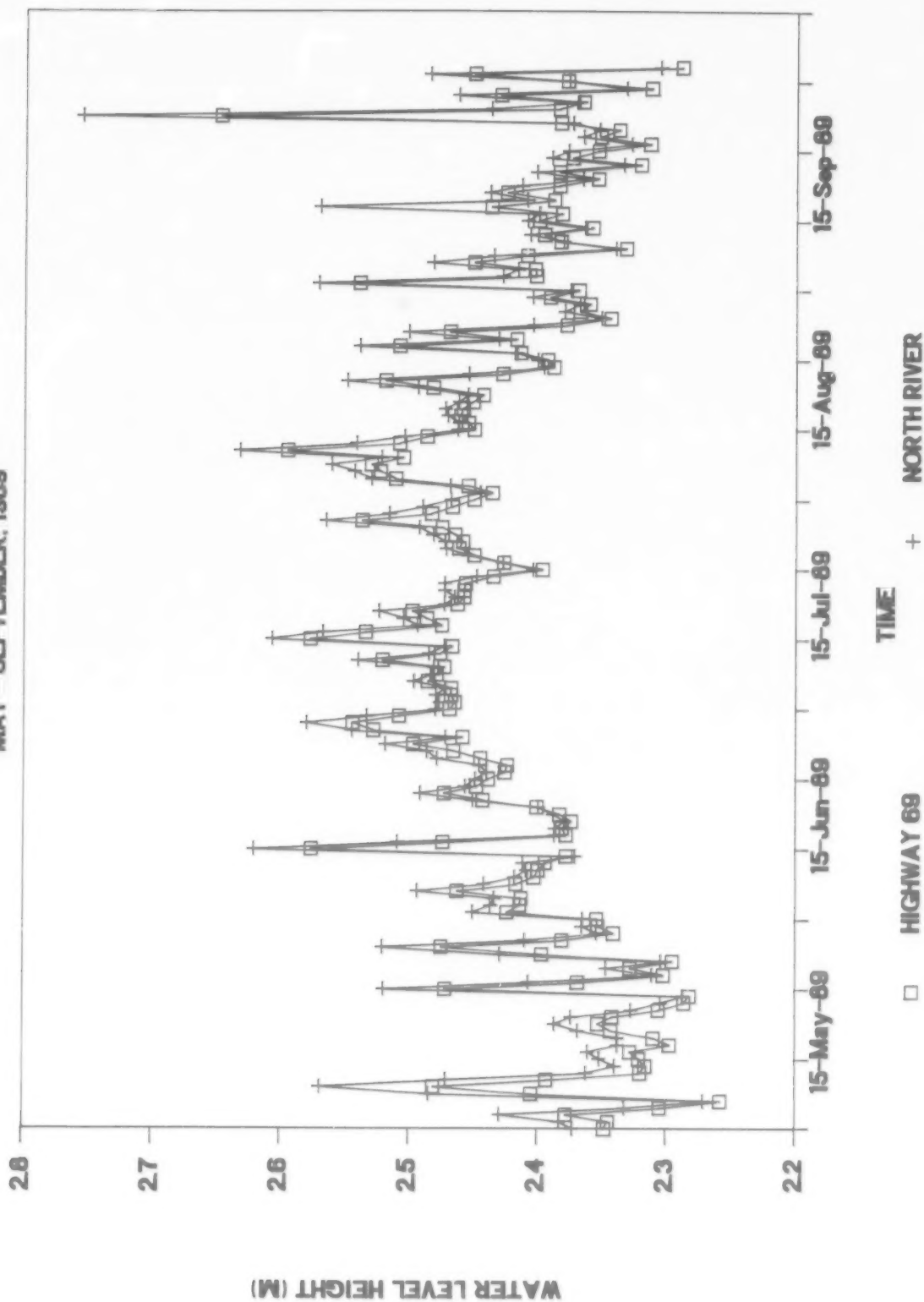
WATER LEVELS, MATCHEDASH BAY

MAY - SEPTEMBER, 1989



WATER LEVELS, MATCHEDASH BAY

MAY - SEPTEMBER, 1989



APPENDIX I

MOE WATER QUALITY DATA NORTH RIVER
COLDWATER RIVER, JAN. 1986 - JUNE 1989

Appendix I: MOE Water Quality Data, North River and Coldwater River, Jan 1986 - June 1989

Station Number	Sample Date	Depth (m)	Temperature C	Dissolved oxygen mg/L	Maximum Depth (m)	Socchi Diaz (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments
MOE Station North River	14-Sep-88							0.023			469			
	22-Sep-88							0.018			459			
	29-Sep-88							0.018			465			
	20-Oct-88							0.018			442			
	28-Oct-88							0.014			434			
	03-Nov-88							0.036			325			
	14-Nov-88							0.015			384			
	23-Nov-88							0.016			295			
	17-Dec-88							0.020			383			
	12-Jan-89							0.011			435			
	25-Jan-89							0.022			396			
	01-Feb-89							0.009			441			
	13-Feb-89							0.025			395			
	07-Mar-89							0.016			405			
	14-Mar-89							0.028			352			
	22-Mar-89							0.088			194			
	28-Mar-89							0.173			146			
	29-Mar-89													
	02-Apr-89						11.3	0.046			248			
	04-Apr-89						14.5	0.045			230			
	05-Apr-89						13.2	0.039			246			
	07-Apr-89						0	0.035			267			

Appendix I: MOE Water Quality Data, North River and Coldwater River, Jan 1986 - June 1989

Station Number	Sample Date	Depth (m)	Temperature C	Dissolved oxygen mg/L	Maximum Depth (m)	Secchi Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umhos/cm	Conductivity @ 25 C umhos/cm	pH	Air Temperature °C	Comments
	12-Apr-89						6.8	0.020			310			
	15-Apr-89						12.7	0.038			293			
	19-Apr-89						1.98	0.018			316			
	26-Apr-89						5.5	0.014			344			
	02-May-89						4.1	0.015			363			
	10-May-89						4.9	0.021			328			
	16-May-89						6.7	0.019			332			
	24-May-89						4.6	0.019			363			
	31-May-89						7.7	0.024			380			
	05-Jun-89						8.5	0.030			376			
	22-Jun-89						9.3	0.044			375			
	MAXIMUM						14.500	0.173			469.000			
	MEAN						7.452	0.031			349.719			
	MINIMUM						0.000	0.009			146.000			
	COUNT						15	32		0	0	32	0	0
MOE Station Coldwater River	29-Jan-86			7.4			4.6	0.014						434
	25-Feb-86			10.8			2	0.010						439
	16-Apr-86			8.2			12.8	0.030						410
	12-May-86			9.8			5.6	0.015						260
	10-Jun-86			9.4			3.5	0.013						395
	08-Jul-86			8.7			6.3	0.021						390
	14-Aug-86			11.3			3.8	0.013						387
	24-Sep-86			10.6			22	0.048						375

Appendix I: MOE Water Quality Data, North River and Coldwater River, Jan 1986 - June 1989

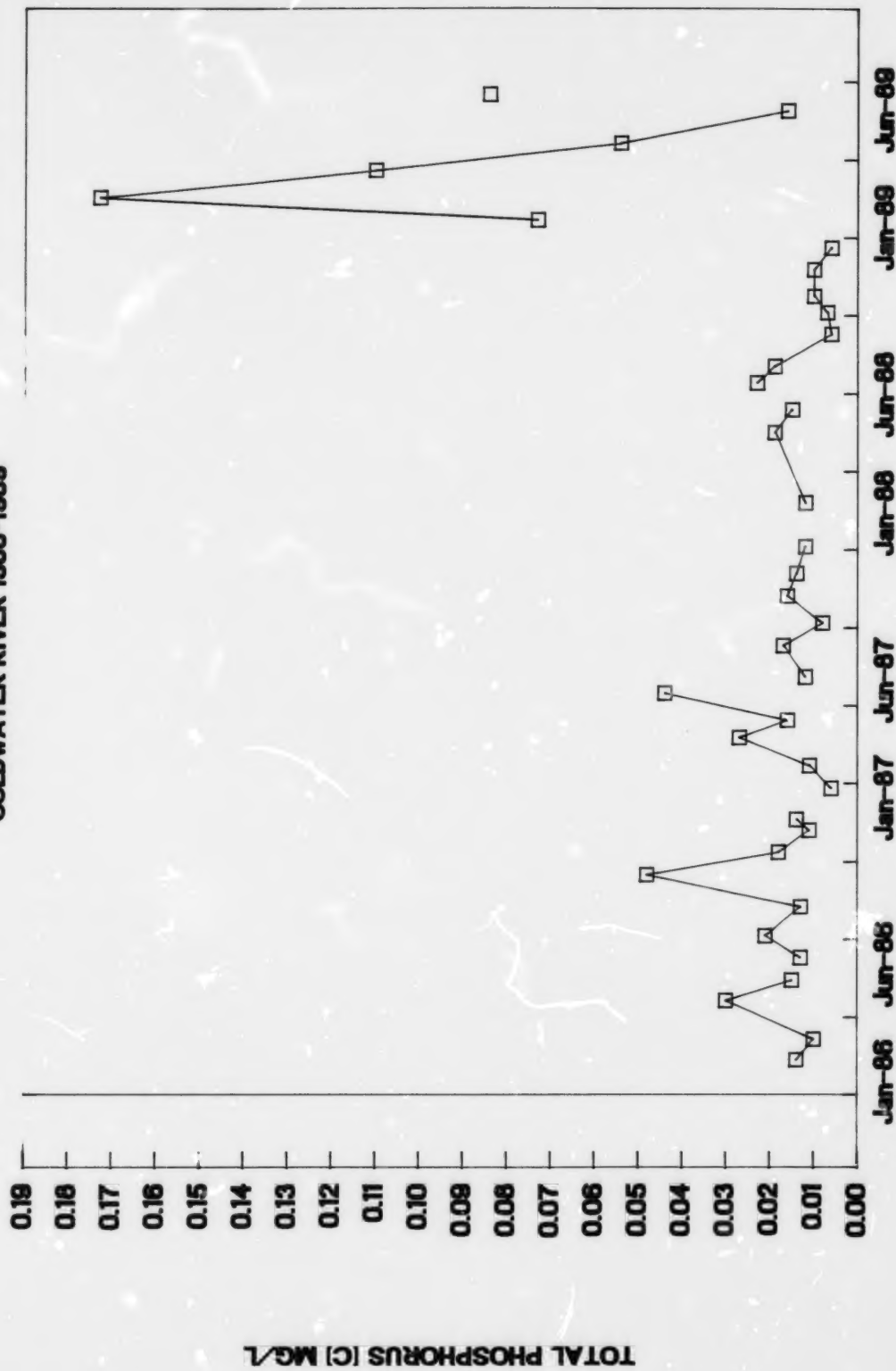
Station Number	Sample Date	Depth (m)	Temperature C	Dissolved oxygen mg/L	Maximum Depth (m)	Secchi Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments
	23-Oct-86			9.8			4.2	0.018			424			
	20-Nov-86			12.6			4.9	0.011			426			
	04-Dec-86			13.2			11.6	0.014			426			
	13-Jan-87			13.3			3.3	0.006			429			
	11-Feb-87			11.9			3.6	0.011			424			
	19-Mar-87			13.8			7.4	0.027			435			
	10-Apr-87			12.0			2.3	0.016			479			
	15-May-87			8.6			13	0.044			433			
	05-Jun-87			7.9			5.6	0.012			395			
	15-Jul-87			8.6			8.8	0.017			383			
	13-Aug-87			8.1			4.3	0.008			390			
	17-Sep-87			7.0			5.8	0.016			396			
	16-Oct-87			10.2			0.78	0.014			396			
	19-Nov-87			11.9			1.36	0.012			408			
	10-Dec-87			11.8			34	0.730			379			
	14-Jan-88			13.4			3	0.012			444			
	13-Apr-88			11.0			4.5	0.019			390			
	12-May-88			8.9			1.1	0.015			407			
	16-Jun-88			7.0			1.75	0.023			396			
	07-Jul-88			6.8			4.3	0.019			394			
	17-Aug-88			7.2			5.7	0.006			386			
	14-Sep-88			8.8			1.95	0.007			396			

Appendix I: MOE Water Quality Data, North River and Coldwater River, Jan 1986 - June 1989

Station Number	Sample Date	Depth (m)	Temperature C	Dissolved oxygen mg/L	Maximum Depth (m)	Secchi Disc (m)	Turbidity FTU	Total Phosphorus mg/L	Chlorophyll a mg/m3	Conductivity Field umho/cm	Conductivity @ 25 C umho/cm	pH	Air Temperature °C	Comments
	05-Oct-88			9.5			4.2	0.010			400			
	08-Nov-88			11.4			6.1	0.010			429			
	06-Dec-88			11.4			2.4	0.006			426			
	11-Jan-89			11.4			32	0.073			431			
	08-Feb-89			12.0			102	0.173			440			
	15-Mar-89			10.5			41	0.110			381			
	19-Apr-89			11.2			1.38	0.054			385			
	31-May-89			8.4			5.6	0.016			419			
	21-Jun-89			8.6			19.6	0.084			419			
MAXIMUM				102.000				0.750			479.000			
MEAN				10.465				0.045			406.564			
MINIMUM				0.780				0.006			260.000			
COUNT				39				39		0	39	0	0	

TOTAL PHOSPHORUS CONCENTRATION MG/L

COLDWATER RIVER 1986-1989



APPENDIX I

**LIFE SCIENCE INVENTORY CHECKSHEET,
MATCHEDASH BAY ANSI**

SITE DISTRICT 6-6: WETLANDS - Marsh

ONTARIO NATURE RESERVES PROGRAM - LIFE SCIENCE INVENTORY CHECK-SHEET

NAME Matchedash Bay		MAP NAME Elmvale	MAP NUMBER 31D/12	UTM REF. 060545
COUNTY, DISTRICT or REGIONAL MUNICIPALITY Simcoe		LAT. 44° 44' N	LONG. 79° 40' W	ALT. MIN. MAX. ca. 600 ft.
LOCALITY mouth of North River, Matchedash Bay		1:50,000 NTS MAP SHOWING AREA BOUNDARIES		
TOWNSHIP		LOTS CONCESSIONS		
AREA ca. 1100 acres ca. 510 ha				
OWNERSHIP				
ADMINISTRATION				
FOREST REGION AND DISTRICT L-1	SITE REGION AND DISTRICT 6-6			
MNR REGION AND DISTRICT Central-Huron	CONSERVATION AUTHORITY ---			
AERIAL PHOTOGRAPHS		BASE MAP: 447793		
YEAR	ROLL	FLIGHT LINE	NUMBERS	
1971	25	4431	91-94	
1971	13	4430	24-27	

PHYSICAL AND BIOLOGICAL FEATURES

Lying 4 km north of Coldwater at the mouth of the North River and along the southern edge of the Canadian Shield, Matchedash Bay harbours a variety of marshland vegetation types. The types include cattail and bulrush (*Scirpus fluviatilis* - *S. cyperinus*) marsh, grass (*Phragmites australis* - *Glyceria grandis*) and sedge (*Carex aquatilis* - *C. stricta* - *C. lanuginosa* - *C. atherodes*) meadow, and open water areas of bladderwort (*Utricularia vulgaris*) - coontail (*Ceratophyllum demersum*). Surrounding lowland forests include the most northerly example of southern lowland or bottomland forest types of red ash, basswood, sugar maple and bur oak on sites varying from wet clay flats to dry rock knolls. Numerous southern species such as blue phlox (*Phlox divaricata*), false mermaid weed (*Floerkea proserpinacoides*), hairy wild rye (*Elymus villosus*), narrow leaved spring beauty (*Claytonia virginica*) occur here, at or near their northern limit of distribution (Reznicek, 1974). Additionally, the marshes act as an important stop-over area for migratory waterfowl. Matchedash Bay is surrounded by pasture land on its northeast to south perimeters with some shoreline cottages along its eastern shore in the northern portion; highway 400 abuts the west and southwesterly sections. Several drainage ditches have been constructed to convey water to the marsh from adjacent agricultural fields.

DATA SHEETS ATTACHED		SUMMARY SPECIES LISTS		MAJOR INFORMATION SOURCES	
PHYSICAL DESCRIPTION	☐	PHYSICAL FEATURES MAP	☐	Cuddy, 1977; Hanna, 1980, Airphoto Interpretation; Reznicek, 1974.	
VEGETATION SUMMARY	☐	VEGETATION MAP	☐		
EVALUATION SHEET	☐	BIBLIOGRAPHY	☐		
COMMUNITY DESCRS.	☐	PHOTOGRAPHS	☐		
COMMUNITY COMP. LISTS	☐				

EVALUATION AND PRIORITIES
As one of the largest cattail-sedge marshes in Site District 6-6, Matchedash Bay contains a variety of marshland, lowland and upland vegetation types, uncommon southern plant species and acts as a migratory waterfowl stop-over area.

DATE COMPILED April, 1981	COMPILED BY R. Hanna
------------------------------	-------------------------

APPENDIX K

**WETLAND EVALUATION AND DATA RECORDS,
MATCHEDASH BAY WETLAND**

APPENDIX K**WETLAND EVALUATION AND DATA RECORDS,
MATCHEDASH BAY WETLAND****WETLAND EVALUATION RECORD**

Wetland Name..... MATCHEDASH BAY

Result of Evaluation: CLASS 1

GENERAL INFORMATION

Ontario Ministry of Natural Resources:

Region CENTRAL

District HURONIA

Conservation Authority I

County or Regional Municipality SIMCOE

Township TAY

UTM Reference Zone 17T

UTM Grid Coordinates 060 540

National Topographic Map Series:

Map Scale 1:50000

Map Number 31D/12 31D/13

Map Name ELMVALE PENETANGUISHENE

Wetland Association Single contiguous

Number of Wetlands in Complex 1

Total Size of Wetland (Ha) 807.4

1.0 BIOLOGICAL COMPONENT

1.1. PRODUCTIVITY VALUES

1.1.1. Growing Degree Days.....	8
1.1.2. Soils.....	10
1.1.3. Type of Wetland.....	19
1.1.4. Site.....	7
1.1.5. Nutrient Status of Surface Water.....	20

TOTAL for Productivity Values	64

1.2. DIVERSITY VALUES

1.2.1. Number of Wetland Types.....	6
1.2.2. Vegetation Communities.....	30
1.2.3. Diversity of Surrounding Habitat.....	10
1.2.4. Proximity to Other Wetlands.....	10
1.2.5. Interspersion.....	12
1.2.6. Open Water Types.....	30

TOTAL for Diversity Values	98

1.3. SIZE (Biological Component)	50

TOTAL FOR BIOLOGICAL COMPONENT	212
--------------------------------	-----

3.0 HYDROLOGICAL COMPONENT

3.1. EFFECT OF ADJOINING LARGE WATER BODY

3.2. FLOW STABILIZATION

3.2.1. Detention due to Surface Area

3.2.1.1. and

3.2.1.2. FIRST step (from Table)..... 0

3.2.1.3. SECOND step..... 0

3.2.1.5. THIRD step..... 0

3.2.1.6. FOURTH step..... 0

3.2.1.7. FIFTH step..... 0

TOTAL for Detention Due to Surface Area 0

3.2.2. Flow Augmentation 0

TOTAL for Flow Stabilization 0

3.3. WATER QUALITY IMPROVEMENT

3.3.1 Short Term Removal of Nutrients from Surface Water

3.3.1.1. Site type..... 5

3.3.1.2. Wetland Area Dominated
by Robust Emergents and
Submergents..... 8

3.3.1.3. Land Use in Catchment Basin 10

TOTAL for Short Term Removal of
Nutrients from Surface Water 23

3.3.2. Long Term Nutrient Trap 7

TOTAL for Water Quality Improvement 30

3.4. EROSION CONTROL

3.4.1. Erosion Buffer

3.4.1.1. Riverine Wetlands..... 0

3.4.1.2. Lacustrine Wetlands..... 13

3.4.1.3. Fetch..... 3

TOTAL for Erosion Buffer 16

3.4.2. Sheet Erosion 0

TOTAL for Erosion Control 16

TOTAL FOR HYDROLOGICAL COMPONENT

46

2.0 SOCIAL COMPONENT

2.1. RESOURCE PRODUCTS WITH CASH VALUE

2.1.1. Timber (lumber and firewood).....	0
2.1.2. Wild Rice.....	10
2.1.3. Commercial Fish (Bait Fish and/or Coarse Fish).....	30
2.1.4. Bullfrogs.....	2
2.1.5. Snapping Turtles.....	2
2.1.6. Furbearers.....	15

TOTAL for Resource Products with Cash Value 59

2.2. RECREATIONAL ACTIVITIES 70

2.3. AESTHETICS

2.3.1. Landscape Distinctness.....	5
2.3.2. Absence of Human Disturbances.....	15

TOTAL for Aesthetics 20

2.4. EDUCATION AND PUBLIC AWARENESS

2.4.1. Educational Uses.....	0
2.4.2. Facilities and Programs.....	0
2.4.3. Research and Studies.....	5

TOTAL for Education and Public Awareness 5

2.5. PROXIMITY TO URBAN AREAS 10

2.6. OWNERSHIP/ACCESSIBILITY 19

2.7. SIZE (Social Component) 20

TOTAL FOR SOCIAL COMPONENT 203

4.0 SPECIAL FEATURES COMPONENT

4.1 RARITY AND/OR SCARCITY

4.1.1. Individual Wetlands.....	20
4.1.2. Wetland Type Representation.....	10
4.1.3. Individual Species	
4.1.3.1. Breeding Habitat for an Endangered Animal or Plant Species.....	0
4.1.3.2. Traditional Migration or Feeding Habitat for an Endangered Animal Species..	0
4.1.3.3. Breeding or Feeding Habitat for a Provincially Significant Animal Species.	150
4.1.3.4. Provincially Significant Plant Species.....	150
4.1.3.5. Regionally Significant Species.....	30

TOTAL for Individual Species 250

TOTAL for Rarity and/or Scarcity 250

4.2. SIGNIFICANT FEATURES AND/OR FISH AND WILDLIFE HABITAT

4.2.1. Nesting of Colonial Waterbirds.....	15
4.2.2. Winter Cover for Wildlife.....	10
4.2.3. Waterfowl Staging.....	100
4.2.4. Waterfowl Production.....	25
4.2.5. Migratory Passerine and/or Shorebird Stopover Area.....	0
4.2.6. Significance for Fish Spawning and Rearing.....	50
4.2.7. Unusual Geological or other Surficial Features.....	0

TOTAL for Significant Features and/or
Fish and Wildlife Habitat 200

4.3. ECOLOGICAL AGE 1

TOTAL FOR SPECIAL FEATURES COMPONENT 250

SUMMARY OF EVALUATION RESULTS

Wetland Name: MATCHEDASH BAY

TOTAL FOR 1.0 BIOLOGICAL COMPONENT..... 212

TOTAL FOR 2.0 SOCIAL COMPONENT..... 203

TOTAL FOR 3.0 HYDROLOGICAL COMPONENT..... 46

TOTAL FOR 4.0 SPECIAL FEATURES COMPONENT..... 250

TOTAL 711

CLASS 1

INVESTIGATORS:

MARK FERGUSON
RON BLACK
WAYNE LEFRANCE

AFFILIATION .. MNR
DATE 01/08/86

WETLAND DATA RECORD

Wetland Name..... MATCHEDASH BAY

Result of Evaluation: CLASS 2

GENERAL INFORMATION

Ontario Ministry of Natural Resources:

Region..... CENTRAL

District..... HURONIA

Conservation Authority..... I

County or Regional Municipality..... SIMCOE

Township Name..... TAY

UTM Grid Reference Zone..... 17T

UTM Grid Coordinates..... 060 540

National Topographic Map Series:

Map Scale..... 1:50000

Map Number..... 31D/12 31D/13

Map Name..... ELMVALE PENETANGUISHENE

Wetland Association..... Single contiguous

Number of Wetlands in Complex..... 1

Total Size of Wetland (Ha)..... 807.4

1. BIOLOGICAL COMPONENT

1.1 PRODUCTIVITY VALUES

1.1.1 Growing degree days code.....	2
1.1.2 Soil Types: % Area for Each Type	
Clay, loam or silt (mineral).....	100
Organic.....	0
Undesignated.....	0
1.1.3 Wetland Types: % Area for Each Type	
Bog.....	0
Fen.....	0
Swamp.....	7
Marsh (including open water marsh).....	93
1.1.4 Site Types: % Area for Each Type	
Isolated.....	0
Palustrine	0
Riverine.....	0
Riverine (at river mouth).....	0
Lacustrine (at river mouth).....	55
Lacustrine (on enclosed bay).....	0
Lacustrine (exposed to lake).....	45
1.1.5 Nutrient Status of Surface Water:	

Location	Initial Specific Conductance	Temperature (Degrees C)	Total Dissolved Solids
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
Average Total Dissolved Solids			0

1.2 DIVERSITY VALUES

1.2.1 Number of Wetland Types.....	2
1.2.2 Vegetation Communities (# of codes)	
a) One form.....	1
b) Two forms.....	2
c) Three forms.....	3
d) Four forms.....	1
e) Five forms.....	2
f) Six forms.....	0
1.2.3 Diversity of Surrounding Habitat:	
Number of Habitat Types.....	10
1.2.4 Proximity to Other Wetlands (code).....	1
1.2.5 Interspersion Type.....	2
1.2.6 Open Water Type.....	5

1.3 SIZE (Ha)..... 807.4

2. SOCIAL COMPONENT

2.1 RESOURCE PRODUCTS WITH CASH VALUE (CODES)

2.1.1 Timber.....	3
2.1.2 Wild Rice.....	1
2.1.3 Commercial Fish.....	1
2.1.4 Bullfrogs.....	1
2.1.5 Snapping Turtles.....	1
2.1.6 Furbearers:	
Types of important furbearers	4
Other furbearers? (1=Yes; 0=No).....	1

2.2 RECREATIONAL ACTIVITIES

 * Intensity of Use Codes: *
 * 1. High 2. Moderate *
 * 3. Low 4. Unknown *
 * 5. Not Possible *

For These Activities:

a) Hunting.....	1
b) Nature Appreciation or Study.....	3
c) Fishing.....	1
d) Canoeing/Boating.....	2

2.3 AESTHETICS (codes)

2.3.1 Landscape Distinctness Code.....	1
2.3.2 Level of Human Disturbance.....	2

2.4 EDUCATION & PUBLIC AWARENESS (Codes)

2.4.1 Educational Uses.....	3
2.4.2 Facilities and Programs.....	3
2.4.3 Research and Studies.....	1

2.5 PROXIMITY TO URBAN AREAS..... 3

2.6 % AREA FOR EACH OWNERSHIP AND ACCESSIBILITY CLASS:

:- ACCESS :-	PUBLIC -----		PRIVATE -----		
	Unrestricted activities	Restricted activities	Open to public	Closed to public	Private & posted
Easy most times	93	0	0	0	7
Easy at times	0	0	0	0	0
Limited	0	0	0	0	0
Difficult	0	0	0	0	0

2.7 SIZE (HA)..... 807.4

3. HYDROLOGICAL COMPONENT

3.1 ADJOINING LARGE WATER BODY (code)..... 2

3.2 FLOW STABILIZATION

3.2.1 Detention Due to Surface Area

3.2.1.1 Catchment Basin Size (sq km)..... 0

3.2.1.2 Total Size of

All Detention Areas (sq km)..... 0

3.2.1.3 Size of Adjoining Lake (ha)..... 0

3.2.1.4 Size of Adjoining River (ha)..... 0

3.2.1.5 Location and Size of Detention Areas

a) Detention Areas Above the Wetland:

AREA No.	DISTANCE FROM WETLAND (Km)	SIZE (ha)
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0

b) Detention Areas Below the Wetland:

AREA No.	DISTANCE FROM WETLAND (Km)	SIZE (ha)
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0

3.2.1.6 Land Use Below Wetland

Land use code 0

Agricultural border length 0

3.2.1.7 Size (ha)..... 807.4

3.2.2 Flow Augmentation

Size of Catchment Basin (sq km)..... 0

Wetland Area as % of Basin 0

3.3 WATER QUALITY IMPROVEMENT (codes)

3.3.1 Short Term Removal of

Nutrients from Surface Water

3.3.1.1 Dominant site code..... 5

3.3.1.2 Area of Emergents and

Submergents (code)..... 5

3.3.1.3 Land Use in Catchment Basin..... 1

3.3.3 Long Term Nutrient Trap..... 2

3.4 EROSION CONTROL

3.4.1 Erosion Buffer Codes:

3.4.1.1 Riverine Wetlands..... 0

3.4.1.2 Lacustrine Wetlands..... 2

3.4.1.3 Maximum Fetch distance code.....	3
3.4.2 Sheet Erosion R Factor code.....	0

4. SPECIAL FEATURES COMPONENT

4.1 RARITY AND/OR SCARCITY

4.1.1 Individual Wetland Unit Number.....	8
4.1.2 Wetland Type Representation:	
Marsh.....	YES
Swamp.....	YES
Fen.....	NO
Bog.....	NO
4.1.3 Individual Species (codes)	
4.1.3.1 Breeding Habitat for an Endangered Animal or Plant Species.....	0
4.1.3.2 Traditional Migration or Feeding Habitat for an Endangered Animal Species.....	0
4.1.3.3 Breeding or Feeding Habitat for a Provincially Significant Animal Species.....	11
4.1.3.4 Provincially Significant Plants.....	5
4.1.3.5 Regionally Significant Species.....	8

4.2 SIGNIFICANT FEATURES AND/OR

FISH AND WILDLIFE HABITAT (codes)

4.2.1 Nesting of Colonial Waterbirds.....	1
4.2.2 Winter Cover for Wildlife.....	4
4.2.3 Waterfowl Staging.....	2
4.2.4 Waterfowl Production.....	2
4.2.5 Migratory Passerine and/or Shorebird Stopover Area.....	2
4.2.6 Significance for Fish Spawning and Rearing.....	1
4.2.7 Unusual Geological or Other Surficial Features (yes=1, no=2).....	2

4.3 ECOLOGICAL AGE: % of Area Covered by:

Bog.....	0
Fen.....	0
Swamp.....	7
Marsh.....	93

INVESTIGATORS:

1st Investigator..... MARK FERGUSON
2nd Investigator..... RON BLACK
3rd Investigator..... WAYNE LEFRANCE
Affiliation..... ENR

DATE (m/d/y)..... 01/08/86

TIME TO COMPLETE SURVEY
(person-hours).... 42

APPENDIX A

BIOLOGICAL COMPONENT

% Area Dominated by Form:

1. h	- Deciduous trees	2
2. c	- Coniferous trees	0
3. dh	- Dead deciduous trees	0
4. dc	- Dead coniferous trees	0
5. ts	- Tall shrubs	0
6. ls	- Low shrubs	0
7. ds	- Dead shrubs	0
8. gc	- Herbs	0
9. m	- Moss	0
10. ne	- Narrow emergents	0
11. be	- Broad emergents	0
12. re	- Robust emergents	50
13. ff	- Free floating plants	0
14. f	- Floating plants	16
15. su	- Submerged plants	32
16. sr	- Shrub-rich	0
17. u	- Unvegetated	0

APPENDIX B

B.1 OWNERSHIP BY WETLAND TYPE

WETLAND	OWNERSHIP (ha)			TOTAL
TYPE	PRIVATE	PUBLIC	UNKNOWN	AREA
SWAMP	0	0	0	0
MARSH	0	0	0	0
BOG	0	0	0	0
FEN	0	0	0	0
TOTAL	0	0	0	0

B.2 AGRICULTURAL CLASSIFICATION BY WETLAND TYPE

WETLAND	AGRICULTURAL CLASSIFICATION (ha)							TOTAL
TYPE	1	2	3	4	5	6	7	AREA
SWAMP	0	0	0	0	0	0	0	0
MARSH	0	0	0	0	0	0	0	0
BOG	0	0	0	0	0	0	0	0
FEN	0	0	0	0	0	0	0	0

B.3 AGRICULTURAL CLASSIFICATION AND OWNERSHIP OF EXTENDED WETLAND

Extended Wetland Area (ha): 0

AG.	OWNERSHIP (ha)			TOTAL
CLASS	PRIVATE	PUBLIC	UNKNOWN	AREA
1	0	0	0	0
2	0	0	0	0
3	0	0	0	0
4	0	0	0	0
5	0	0	0	0
6	0	0	0	0
7	0	0	0	0

MATCHEDASH BAY - Tay Twp. - Map no. 2

UTM GRID 060 540

Wetland Area = 807.4 ha

Air Photos 446743 4452 40-44

4451 110-114

446793 4452 38-39

447793 4453 101-104

4454 58

Tay Township Conc XI Lots 7-9

Conc XII Lots 2-10

Conc XIII Lots 2-10

Evaluation Date: July 27, 30 / 1984

January 8 / 1986

Class = 1

Scale 1:10 000



- Wetland Boundary
- Vegetation Community Boundary
- Shoreline
- Stream (with direction of flow)

VEGETATION SYMBOLS

- h deciduous trees
- c coniferous trees
- dh,dc dead trees
- ls tall shrubs
- ls low shrubs
- ds dead shrubs
- sr shrub rich
- gc ground cover
- m moss
- ne narrow-leaved emergents
- be broad-leaved emergents
- re robust emergents
- ff free floating plants
- f floating plants
- su submerged plants
- u unvegetated

WETLAND TYPE

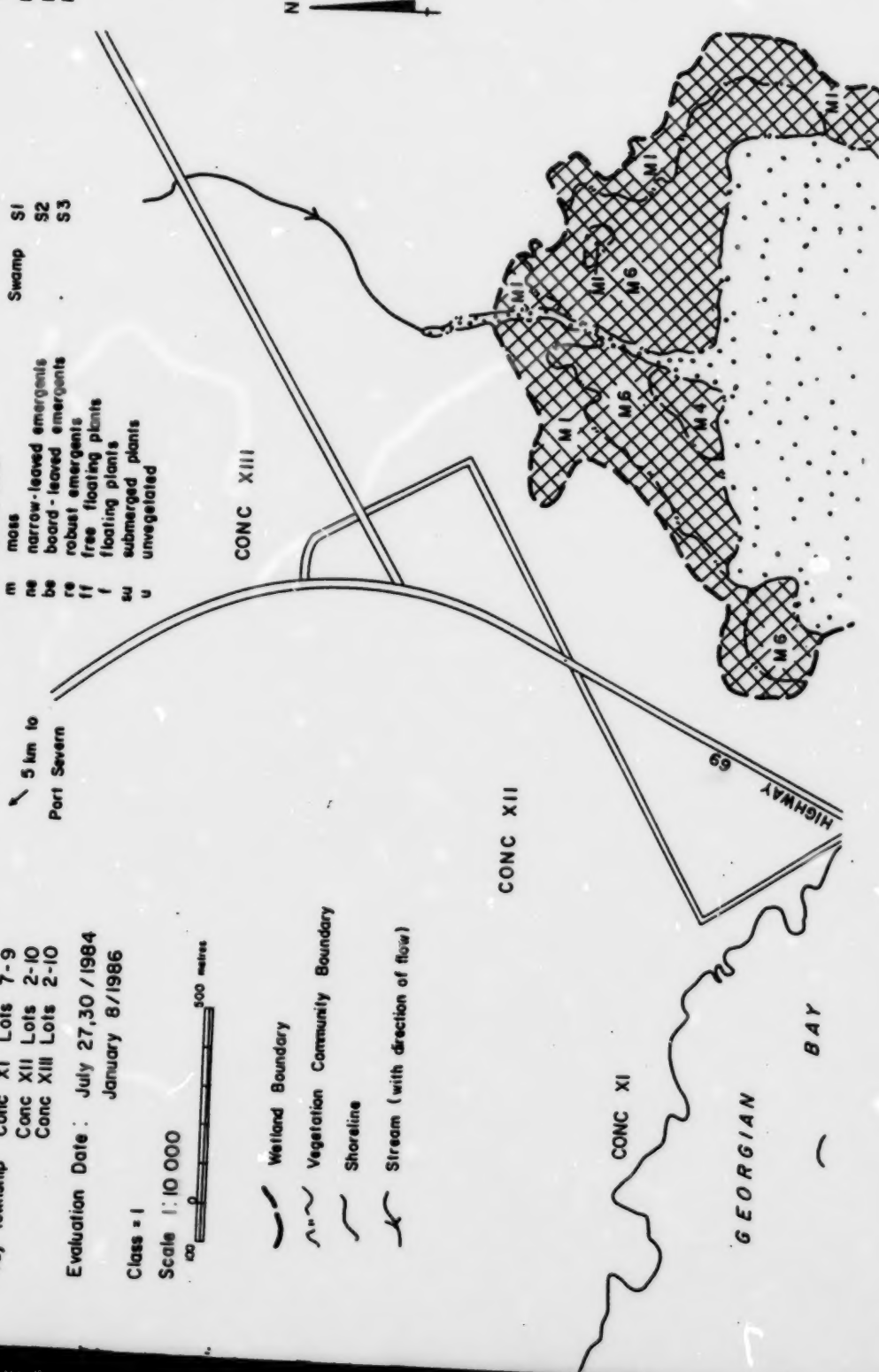
- Marsh M1
- M2
- M3
- M4
- M5
- M6
- Swamp S1
- S2
- S3

VEGETATION FORM

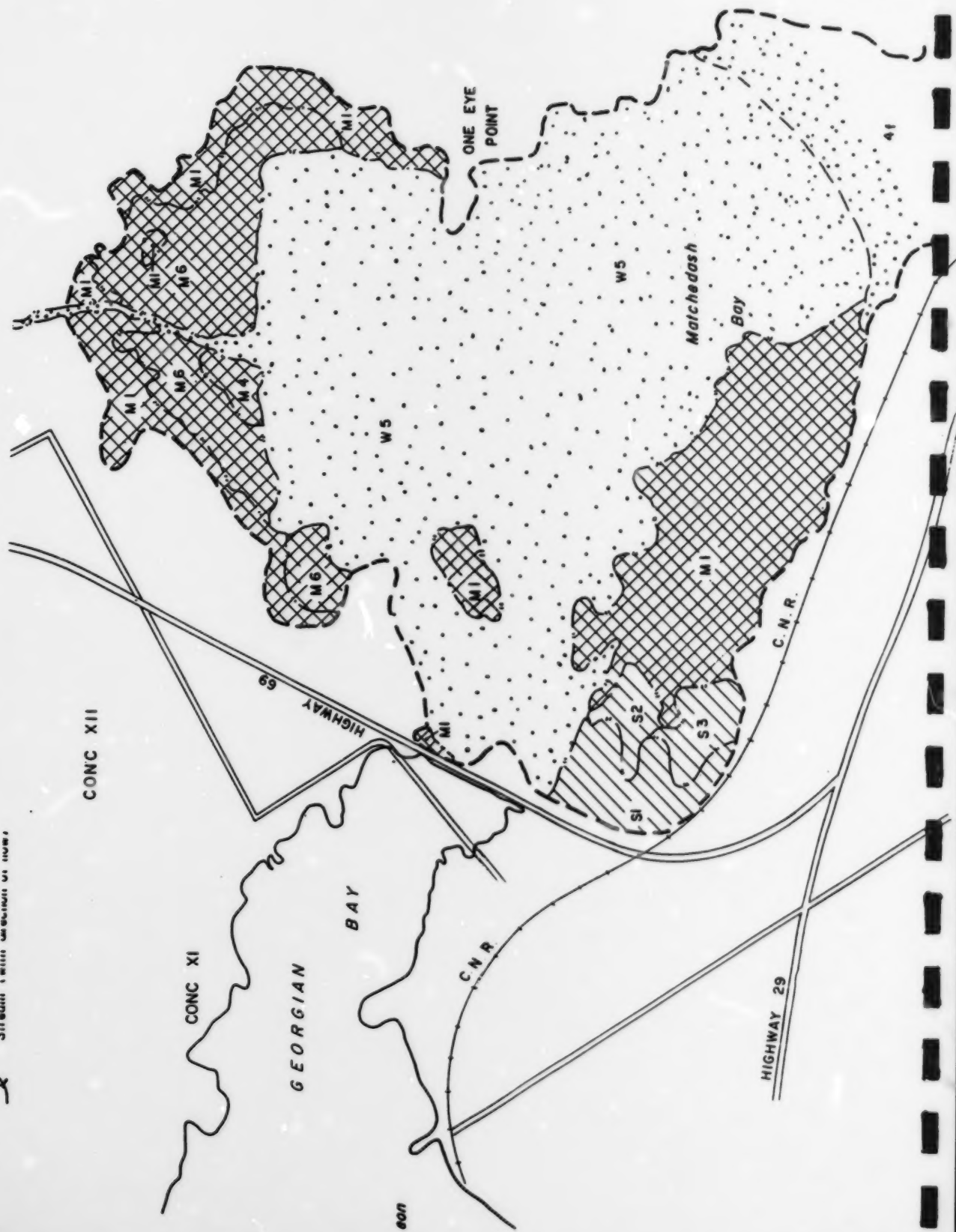
- re, f, su
- ne, gc
- re, ne, gc
- f, su
- su (open water)
- re, ne, su
- h, ls, ne, gc
- h, ls, ls, ne, ff
- h, ls, ls, ne, gc

WETLAND TYPE

- Swamp
- Marsh
- Open Water

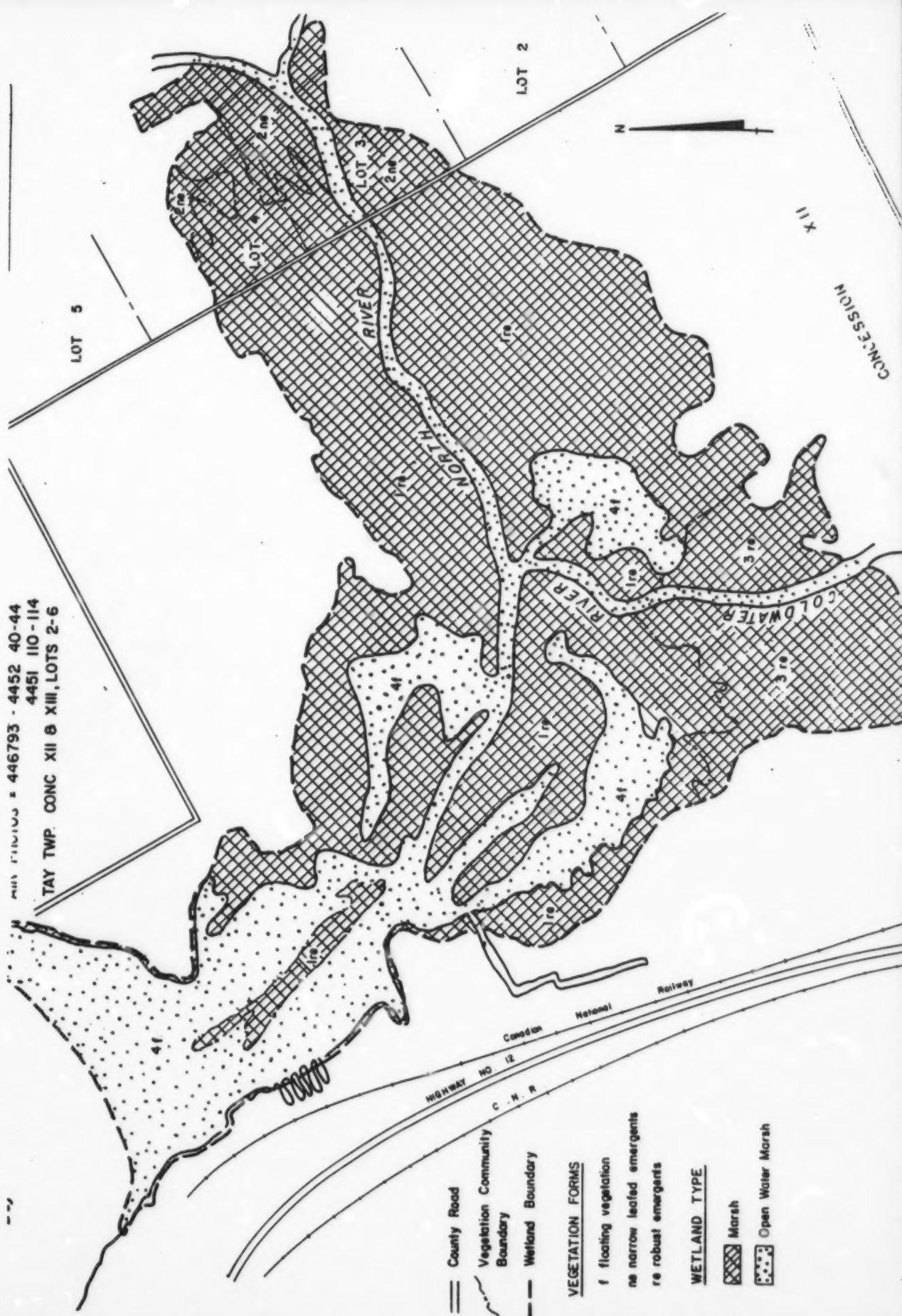


31100000 1 00000 00000000 00 00000



MAP no. 1 match

4451 110-114
 TAY TWP. CONC XII & XIII, LOTS 2-6
 4452 40-44



- County Road
- Vegetation Community Boundary
- Wetland Boundary

VEGETATION FORMS

- f floating vegetation
- ne narrow leaved emergents
- re robust emergents

WETLAND TYPE

- Marsh
- Open Water Marsh

**MAPS
NOT
FILMED**

**CARTES
OMISES**